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FOUNDED BY DR. MAX THOREK

Vol. XV *May, 1951* No. 5

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THE SIXTEENTH
ASSEMBLY AND CONVOCATION
of the
UNITED STATES CHAPTER
INTERNATIONAL COLLEGE OF SURGEONS
IN CONJUNCTION WITH THE CANADIAN
CHAPTER
at

PALMER HOUSE—CHICAGO

Convention Headquarters

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CONTENTS—MAY, 1951

Diagnosis of Surgical Diseases of the Spleen 531
Thomas H. Bate, M.D., F.A.C.S., F.I.C.S., Phoenix, Arizona

Study of Breast Secretion for Detection of Intramammary Pathologic Change and of Silent Papilloma 552
Dudley Jackson, M.D., F.A.C.S., and David A. Todd, M.D., F.A.S.C.P., and Paul L. Gorsuch, M.D., San Antonio

Endocrine Therapy in Gynecologic Practice 569
Jacob Kotz, M.D., F.A.C.S., F.I.C.S., and Morton S. Kaufman, M.D., Washington, D. C.

Polyethylene Intubation in Reimplantation of the Oviducts 576
John I. Perl, M.D., F.A.C.S., Chicago

Personal Evaluation of Vagotomy in the Treatment of Peptic Ulcer 585
Kenneth C. Sawyer, M.D., F.A.C.S., F.I.C.S., Denver

Pilonidal Sinus: Etiology of Recurrence 591
Harry R. Grau, M.D., Daytona Beach, Florida

Recurrent Inguinal Hernia 605
D. P. Hall, M.D., F.A.C.S., F.I.C.S., Louisville, Kentucky

Management of Eye Injuries by the General Surgeon in the Absence of an Ophthalmologist 614
F. L. Philip Koch, M.D., Bronxville, New York

Foreign Bodies in Hepatic Ducts: Review of the Literature 624
Max Thorek, M.D., F.I.C.S., Chicago

Eosinophilic Variations After Irradiation of the Adrenal Glands 628
Prof. Dr. Manuel A. Manzanilla, F.I.C.S. (Hon.), and Manuel A. Manzanilla, Jr., Mexico, D.F., Mexico

Berylliosis and Silicosis 632
Raphael Pomeranz, M.D., F.A.C.R., F.I.C.S., and Henry A. Brodkin, M.D., F.A.C.S., F.I.C.S., Newark, New Jersey

Retropubic Prostatectomy: A Modification of the Millin Operative Technic (1945) 639
C. M. Carruthers, M.D., F.R.C.S. (Eng.), Sarnia, Ontario

The Problem of the Thyroid Gland from the Standpoint of the Anesthesiologist 646
John S. Lundy, M.D., F.I.C.S. (Hon.), Rochester, Minnesota

The Concept of Mobilization and Its Relation to Poliomyelitis 649
Harvey E. Billig, Jr., M.D., F.I.C.S., Los Angeles

EDITORIAL
No Comment 653

NEW HORIZONS
From Generation to Generation 655

CHAPTER NEWS 656

GENERAL NEWS NOTES 659

NEW BOOKS 661

ABSTRACTS FROM CURRENT LITERATURE 664

ARMAMENTARIUM 667

IN MEMORIAM 668

HOME OF THE INTERNATIONAL COLLEGE OF SURGEONS AND THE UNITED STATES CHAPTER .. 669

REGENTS OF THE UNITED STATES CHAPTER, INTERNATIONAL COLLEGE OF SURGEONS 670

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Vol. XV MAY, 1951 No. 5

Original Articles

Diagnosis of Surgical Diseases of the Spleen

THOMAS H. BATE, M.D., F.A.C.S., F.I.C.S.

PHOENIX, ARIZONA

THE successful diagnosis of surgical diseases of the spleen depends upon the close cooperation of the hematologist and the surgeon. Bone marrow smears as well as peripheral blood studies must be correlated and compared with an accurate history and a careful physical examination.

During the past few years many advances in knowledge of the physiology of the spleen have been made. Figure 1 presents in a diagrammatic manner the function of the spleen.

Advances have also been made in the field of hematology. Figure 2 illustrates the hematopoietic system.

The indications and contraindications generally accepted for splenectomy are as follows:

Indications.—(*a*) Banti's disease; (*b*) Felty's disease; (*c*) hemolytic jaundice; (*d*) primary splenic panhematocytopenia; (*e*) splenic neutropenia; (*f*) thrombocytopenic purpura; (*g*) thrombosis or anomalous obstruction of the splenic vein; (*h*) rupture of the spleen, and (*i*) cysts, primary tumors and abscesses.

Possible Indications. — (*a*) Gaucher's disease; (*b*) malaria; (*c*) ptosis, and (*d*) conditions for which the spleen is removed with the stomach.

Contraindications. — (*a*) acute splenic tumor, or acute infection; (*b*) Hodgkin's disease; (*c*) leukemia; (*d*) metastasis; (*e*) infestation with parasites (trichinosis, filariasis, kala-azar, distomiasis); (*f*) pernicious anemia; (*g*) polycythemia, and (*h*) sickle cell anemia.

BANTI'S SYNDROME

There has been controversy over this syndrome since study of it was initiated by Banti in 1883. Not only has the etiologic background of the syndrome been disputed, but its actual existence has been challenged. It is rather poorly defined and probably includes several entities which may eventually be established as independent syndromes; for instance, (*1*) cirrhosis of the liver with splenomegaly;

Submitted for publication March 6, 1951.

(*2*) abdominal thrombophlebitis, particularly thrombophlebitis of the splenic vein; (*3*) splenomegaly secondary to venous obstruction by extrinsic causes; (*4*) chronic infectious splenomegaly, and so on. The term "congestive splenomegaly" has been offered for this syndrome, since there is much evidence to suggest that a chronic obstructing lesion at the portal or splenic vein is responsible for the enlargement of the spleen. In the presence of progressive splenomegaly of long standing, it is not difficult to consider variable blood conditions (anemia, leukopenia or thrombocytopenia) as tertiary phenomena, dependent on the splenomegaly and not necessarily on the original pathologic change. At all events, the congestive hypothesis gives a good working basis for differential diagnosis.

Many workers now believe that if cirrhosis is not part of the original pathologic condition it does not necessarily develop. If congestive splenomegaly is to be explained from an anatomic standpoint, cirrhosis of the liver should occur first and the hepatic condition should give rise to chronic obstruction of the portal vein and secondary splenomegaly. If the splenic vein becomes obstructed by external pressure or intrinsic thrombophlebitis, the obstruction to the flow of blood will produce chronic passive congestion of the spleen and will result in progressive enlargement of this organ. It can also be seen, with such obstruction, why varicosities of the esophagus develop by a shunting of the circulation away from the portal vein and up through the gastric and esophageal vessels to the superior vena cava.

Abnormalities in the peripheral blood undoubtedly are secondary to the splenomegaly, although the nature of this is not clear. In the majority of cases there is some disturbance in the values for any or all of the elements in the circulating blood. In the presence of so-called splenic anemia there is ordinarily no evidence of hemolytic activity of the spleen. The anemia may be normocytic and normochromic, suggesting suppressed bone marrow activity, or, in some cases, particularly if cirrhosis of the liver is an outstanding feature, macrocytosis may be present. In cases in which repeated hemorrhage takes place, microcytic hypochromic anemia of the iron deficiency type may occur. Commonly there is leukopenia, which again may reflect increased phagocytic activity of the spleen or some suppressive effect on the bone marrow. The same can be said for thrombocytopenia.

After splenectomy the blood values usually return to more nearly normal levels; this is the greatest indication for splenectomy in this disease. A secondary benefit is that the blood which formerly went to and from the spleen is eliminated, and this reduces the load on the collateral circulation. However, there is usually no diminution in size of the patient's varicosities, and hemorrhage usually will recur. If the congestive or obstructive hypothesis is correct this may be expected, since splenectomy in no way alters the circulatory bed itself. If cirrhosis of the liver is primary, there is probably little to expect from splenectomy other than correction of the blood values which may be secondary to the hypersplenic condition. It is not to be expected that the cirrhotic process will be altered; if cirrhosis is present, the treatment should be that used for primary cirrhosis of the liver. With cirrhosis one of the shunting operations will alleviate the abnormal load on the circulatory bed.

In the differential diagnosis of this condition liver function tests should be employed. In cases in which abdominal thrombophlebitis involving the portal or splenic vein or both is present, there is often a history of recurring bouts of abdominal pain, fever, chills, leukocytosis and physical signs and symptoms suggestive of an acute condition of the abdomen. Splenic infarctions occur not uncommonly in association with this condition, and they may be extensive, giving rise to a splenic abscess. This rather poorly defined syndrome often is diagnosed by excluding the other causes of splenomegaly.

I. VASCULAR SYSTEM

A. Structure

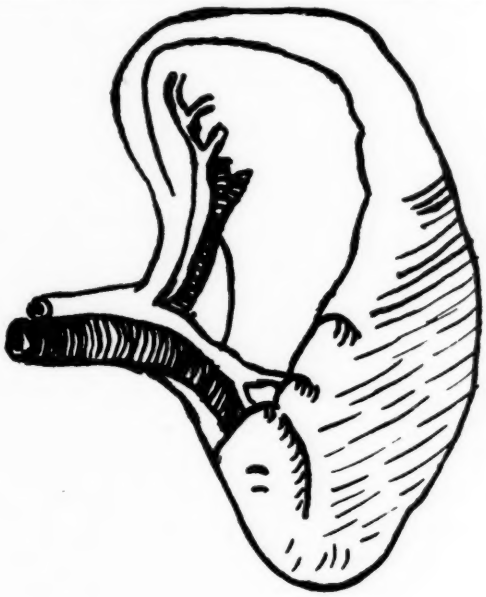
1. Artery
2. Sinusoid
3. Vein

B. Function

1. Reservoir for cells and plasma

C. Diseases

1. Storage and congestive splenomegalies



II. LYMPHOID SYSTEM

A. Structure

1. Lymphoblasts
2. Lymphocytes

B. Function

1. Unknown; may be concerned with endogenous protein metabolism

C. Diseases

1. Serum sickness
2. Chronic lymphatic leukemia
3. Protein intoxication

III. RETICULOENDOTHELIAL SYSTEM

A. Structure
   1. Endothelium
      a. Clasmatocytes
   2. Reticulum
      a. Clasmatocytes
      b. Monocytes
      c. Reticulum cells

B. Function
   1. Phagocytosis
   2. Blood formation
   3. Platelet formation
   4. Leukocyte formation
   5. Erythrocyte formation
   6. Globulin
   7. Bacteria, debris, etc.

C. Diseases
   1. Splenic neutropenia
   2. Purpura haemorrhagica
   3. Congenital hemolytic jaundice
   4. Abscesses, tumors, etc.
   5. Ectopic blood formation
   6. Immunity problems

Fig. 1.—Functions of spleen as related to vascular, lymphoid and reticuloendothelial systems.

Diagnostic Points

Clinical

Splenomegaly
Hemorrhage from esophageal varices

Hematologic

1. Bone marrow:
   Variable with stage of disease. If no anemia, marrow is normal. Early stage reveals myeloid hyperplasia (Limarzi) "maturation arrest"; late stage reveals erythroid immaturity if cirrhosis is present, erythroid hyperplasia if bleeding occurs.
   Maturation arrest of myeloid series
   Increase of megakaryocytes if cirrhosis is present
2. Peripheral blood:
   Anemia
   Leukopenia

Other laboratory data

Late stages of disease reveal
Increased icteric index
Positive liver function tests

FELTY'S DISEASE

This disease was described some twenty-five years ago. At present there is some controversy as to whether this constitutes a separate syndrome. Of the original 5 patients described 4 had anemia, whereas all had neutropenia. Unfortunately in these records no platelet count was recorded. The bone marrow is usually hypercellular, predominantly involving granulocytic elements, although some cases have been reported in which the marrow was aplastic. The spleen shows reticular hyperplasia and erythrophagocytosis. The usual clinical manifestations are: chronic deforming arthritis (rheumatoid), anemia, splenomegaly, leukopenia, cutaneous pigmentation and lymphadenopathy. Occasionally there are evidences of thrombocytopenic purpura. Many authors consider this panhematocytopenia, but of the secondary type, since the rheumatoid arthritis is the important feature of the disease.

Splenectomy may not be curative in this disease. Most authors record a definite improvement, but this may prove to be only temporary.

Diagnostic Points

Clinical

Splenomegaly
Rheumatoid arthritis
Cutaneous pigmentation
Lymphadenopathy

Hematologic

1. Bone marrow:
   Hyperplastic, predominantly involving granulocytes
2. Blood:
   Panhematocytopenia, usually leukopenia

HEMOLYTIC JAUNDICE

Congenital hemolytic jaundice, or Minkowski-Chauffard disease, must be differentiated from the acquired or Hayem-Widal type. In the average case of hemolytic jaundice there is little interference with the well-being of the patient except for the yellow coloration of the skin and slight anemia. Symptoms are occasionally not noted until adult life. Splenomegaly, jaundice, anemia, spherocytosis and increased fragility of the red blood cells are the prominent manifestations of familial jaundice. Reticulocytosis and increased urobilinogenuria are usually noted. The spleen can be greatly enlarged and may be ten times larger than normal. One-half to two-thirds of the patients have gallstones. The spleen's tendency to filter out and destroy the spherocytes is responsible for jaundice and splenomegaly.

Acquired hemolytic jaundice presents very similar manifestations to those just described. This type of hemolytic anemia may be the result of circulating hemolysins which may follow repeated transfusion of Rh-positive blood to an Rh-negative patient or the activation of some specific hemolysin in a syphilitic person exposed to cold, severe burns, bacterial infection or snake venom.

A third condition frequently confused with congenital hemolytic jaundice is Lederer's anemia. This is secondarily due

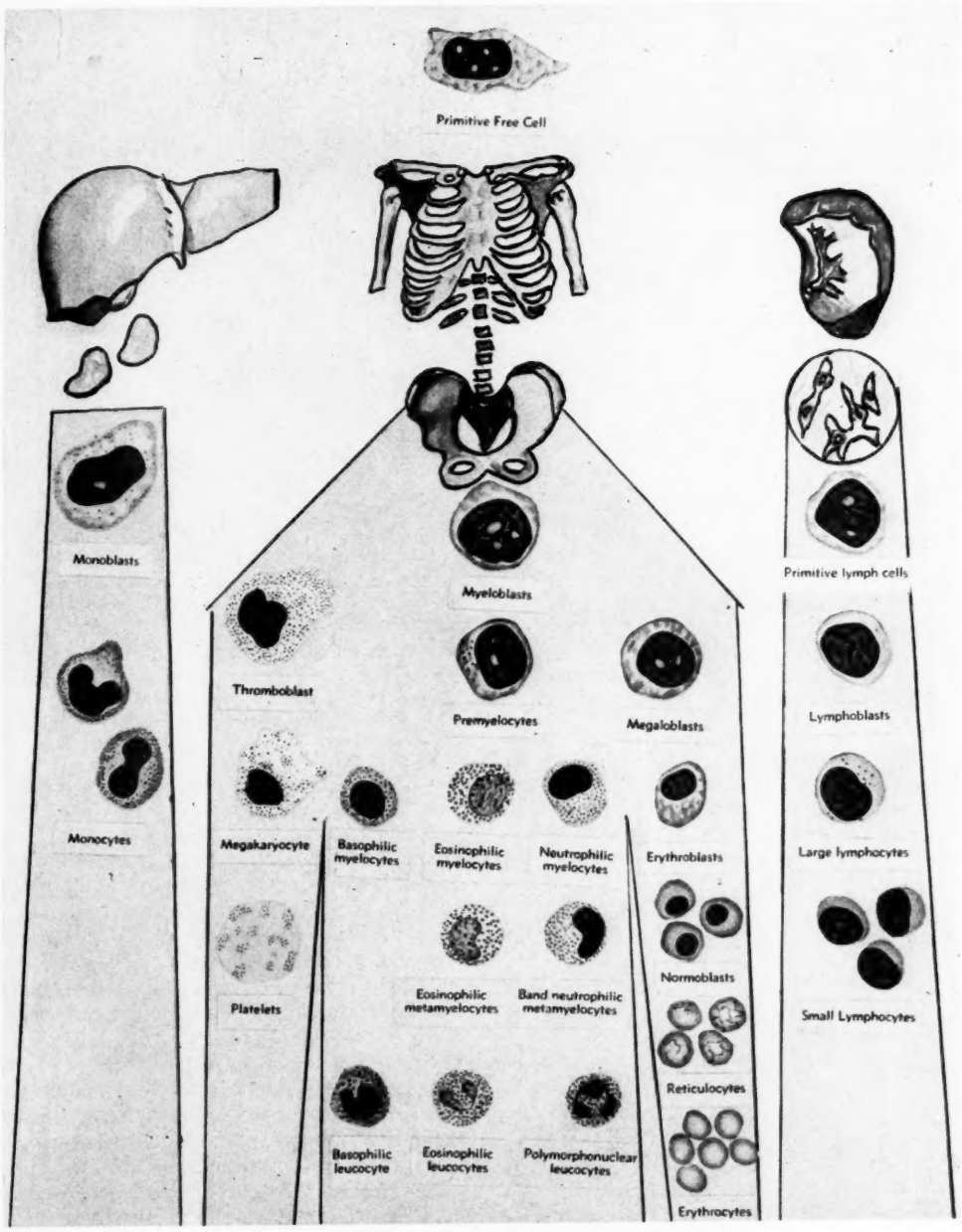


Fig. 2.—Diagram of the hematopoietic system.

to an infectious process. It has been most commonly observed as following respiratory infections among children. There may be a palpable spleen, spheromicrocytosis and increased fragility. Lederer's anemia is corrected by blood transfusion.

Diagnostic Points

Clinical

Splenomegaly
Jaundice

Hematologic

1. Bone marrow:
   Panhyperplasia
2. Blood:
   Increase in nucleated red blood cells; reticulocytosis
   Anemia

Other laboratory data

Increased fragility of red blood cells
Urobilinogenuria

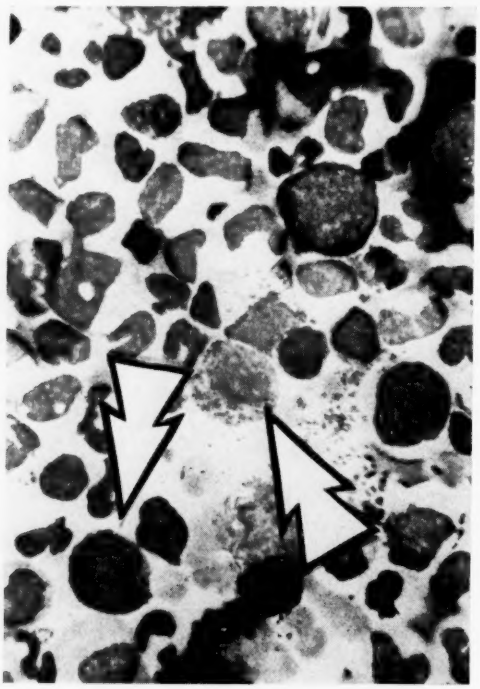


Fig. 3.—Bone marrow smear in an early case of Banti's disease. Arrow indicates megloblasts.

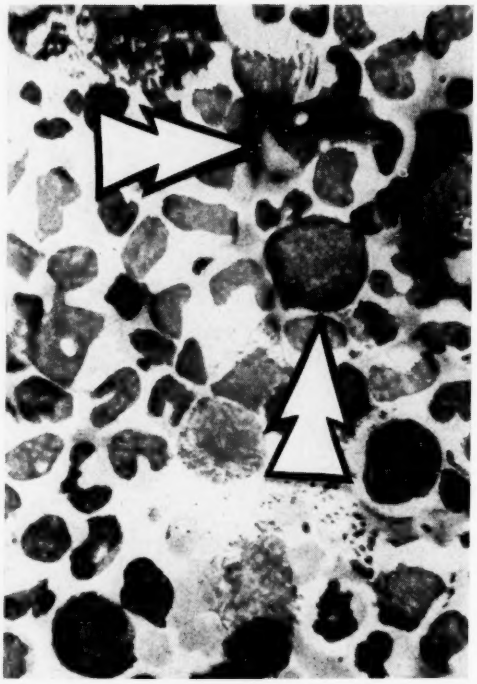


Fig. 4.—Bone marrow smear in a case of Felty's disease showing a hyperplasia involving chiefly the granulocytes. Arrows indicate a primitive myelocyte and a young neutrophil.

PRIMARY SPLENIC PANHEMATOCYTOPENIA

This is a rather rare disease of the spleen described by Doan and White in 1946. This disease may be congenital, acute or even secondary to such conditions as Hodgkin's disease, drug sensitization, Gaucher's disease, etc. The syndrome probably represents a type of hypersplenism in which the splenic hormonal functions become exaggerated, with the result that an inhibitory effect is produced on the maturation and delivery of granulocytes, erythrocytes and platelets from the bone marrow to the blood. Cases have been described in which the spleen at the same time destroys red blood cells excessively; thus a hemolytic component may be added to the three factors just named. Examination of the peripheral blood reveals neutropenia, anemia and thrombocytopenia; in other words, pancytopenia

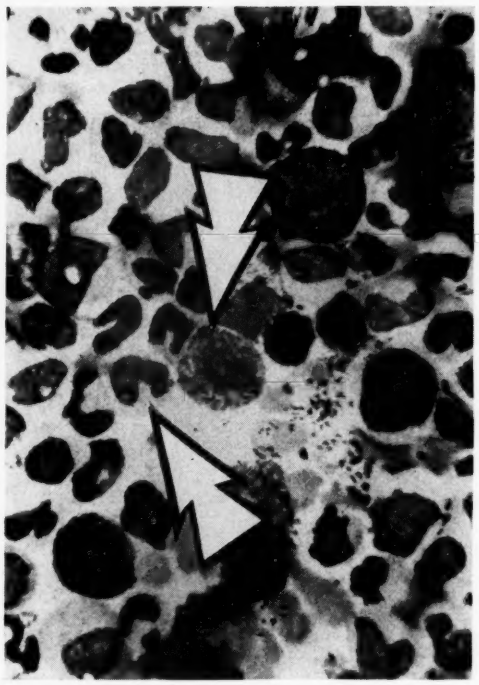


Fig. 5.—Bone marrow smear in a case of hemolytic jaundice showing hyperplasia of all series. Arrows indicate a myelocyte and a neutrophil.

results. This disease is a combination of hemolytic anemia, purpura and neutropenia. Bone smears show hyperplasia of all marrow elements, with the normoblasts predominating. These data on the bone marrow must be demonstrated before splenectomy is undertaken.

Diagnostic Points

Clinical

Splenomegaly
Fluctuating jaundice
Malaise, pallor, weakness

Hematologic

1. Bone marrow:
   Hyperplastic in all elements (predominantly normoblasts)
2. Peripheral blood:
   Panhematocytopenia

SPLENIC NEUTROPENIA

This is a rather rare condition consisting of splenomegaly and peripheral granulopenia. This disease may represent a selective form of hypersplenism, in which the splenic hormones have a deleterious effect on the maturation and delivery of granulocytes from the bone marrow to the blood.

Wiseman and Doan have stated that there is little doubt that a single mechanism may be responsible for the various degrees of anemia, neutropenia or thrombocytopenia. Their cases show that all these elements were increased after splenectomy. They expressed the opinion that the syndrome described is closely akin to that of congenital hemolytic icterus and essential thrombocytopenic purpura and probably is the result of a comparable mechanism. The common denominator of

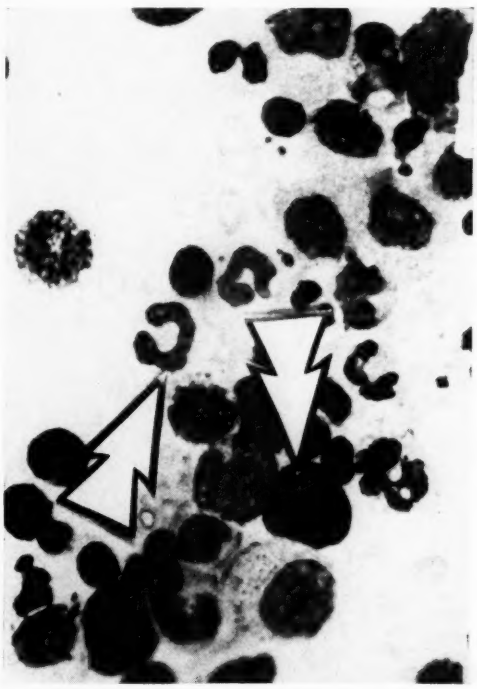


Fig. 6.—Bone marrow smear from a patient with splenic neutropenia, showing hyperplasia of the myeloid and erythroid series. Arrows indicate an erythroblast and a neutrophil.

Diagnostic Points in Surgical Diseases of the Spleen

	Symptoms	Bone Marrow Studies	Peripheral Blood Smears	Other Laboratory Procedures
Banti's disease	1. Splenomegaly 2. Hemorrhage from esophageal varices	1. Variable by stage of disease (a) If no anemia marrow is normal (b) Early 1. Myeloid hyperplasia (Limarzi) "maturation arrest" (c) Late 1. Erythroid immaturity if cirrhosis is present 2. Erythroid hyperplasia if bleeding occurs 3. Maturation arrest of myeloid series 4. Increase of megkaryocytes if cirrhosis is present	1. Anemia 2. Leukopenia	1. Late stages of disease (a) Increased icteric index (b) Positive liver function tests
Felty's disease	1. Rheumatoid arthritis 2. Splenomegaly 3. Cutaneous pigmentation 4. Lymphadenopathy	1. Hyperplastic, predominantly involving granulocytes	1. Panhematocytopenia	
Hemolytic jaundice	1. Splenomegaly 2. Jaundice 3. Anemia	1. Hyperplasia (a) Myeloid (b) Erythroid (c) Megakarocytic	1. Increase in nucleated red blood cells	1. Increased fragility of red blood cells 2. Urobilinogenuria
Primary splenic panhematocytopenia	1. Splenomegaly 2. Fluctuating jaundice	1. Hyperplastic in all types with the normoblasts predominating	1. Panhematocytopenia	
Splenic neutropenia	1. Splenomegaly 2. Occasional oral ulceration 3. Occasional mild icterus	1. Hyperplastic (a) Myeloid series (b) If hemolytic jaundice is present: 1. Erythroid series 2. No abnormal cells present 3. Not leukemic	1. Marked specific neutropenia 2. Anemia, macrocytic hyperchromic type 3. Reticulocytosis if anemia is present 4. Thrombocytopenia variable	
Rupture of spleen	1. Acute-Accidental (a) Pain LUQ (b) Shock 2. Delayed (a) Interval between accident and onset (b) Pain LUQ (c) Pain in left shoulder		1. Leukocytosis and anemia, depending on hemorrhage	1. Gastrectasia 2. Serration lower border of stomach 3. Absence of splenic shadow 4. Inferior displacement of splenic flexure
Thrombocytopenic purpura	1. Purpuric spots 2. Bleeding from membranes and orifices 3. Positive tourniquet test 4. Increased capillary fragility	1. Increase in number of immature megakarocytes without platelet formation	1. Low platelet count 2. Anemia	1. Normal coagulation 2. Poor clot retraction

Diagnostic Points in Surgical Diseases of the Spleen (Continued)

	Symptoms	Bone Marrow Studies	Peripheral Blood Smears	Other Laboratory Procedures
Thrombosis of splenic vein	1. Splenomegaly 2. Jaundice 3. Anemia	1. Myeloid hyperplasia (maturation arrest)	1. Anemia 2. Leukopenia 3. Thrombopenia	
Gaucher's disease	1. Splenomegaly 2. Pigmentation of skin 3. Yellow pigmentation of cornea 4. Heptomegaly 5. Palpable thickening of long bones	1. Foam of Gaucher's cells 2. Reticulum cells	1. Panhematocytopenia	1. Angular deformity of spine 2. Pathologic fractures 3. Clubbing of left third of femur 4. Flattening of head of femur

all three diseases is profound granulocytopenia, panhyperplasia of the bone marrow, a large spleen, and cure by splenectomy; also, varying degrees of anemia and thrombocytopenia, which were asymptomatic and correctable by removal of the spleen.

In the opinion of these investigators, a single mechanism was responsible for the varying degrees of anemia, neutropenia and thrombocytopenia. The spleens all showed excessive phagocytosis of granulocytes, red cells and platelets. They concluded that the syndrome is due to hypersplenism in which there is an accentuation of the physiologic function of disposing of blood cells and that it is comparable to hemolytic icterus and essential thrombocytopenic purpura. In the former disease the phagocytic activity of the spleen is directed chiefly against the red blood cells; in the latter, chiefly against the platelets, and in the neutropenic syndrome, chiefly against the granulocytes.

Diagnostic Points

Clinical

Splenomegaly

Occasionally purpura (depends on degree of associated thrombocytopenia)

Occasionally oral ulceration (depends on acuteness and severity of neutropenia)

Occasionally mild icterus (depends on degree of associated anemia)

Hematologic

1. Bone marrow:
   Hyperplastic for myeloid series and, if hemolytic anemia is pronounced, erythroid series
   No abnormal cells present

2. Peripheral blood:
   Marked neutropenia
   Anemia when present is macrocytic in type
   Reticulocytosis if anemia is present
   Increased indirect van den Bergh,

Fig. 7.—Scout roentgenogram of abdomen in a case of ruptured spleen. Arrows indicate gastrectasia, serration of greater curvature, absence of splenic shadow and in this case only a slight depression of the splenic flexure.

depending on the degree of anemia noted
Thrombocytopenia variable

THROMBOCYTOPENIC PURPURA

This disease may be either primary or secondary. The removal of the spleen in cases of the secondary type is usually unsatisfactory. Clinical manifestations of essential or primary thrombocytopenic purpura are: prolonged bleeding time, normal coagulation, poor clot retraction or none, a low platelet count, anemia, ecchymosis, petechiae and bleeding from the mucous membranes or body orifices. The anemia is related to the loss of blood and usually gives rise to weakness and malaise. A useful diagnostic procedure is the tourniquet test. The blood pressure cuff, placed on the arm in the usual fashion and inflated, produces positive formation of petechiae. The spleen may be only slightly enlarged or not palpable. The marked splenic enlargement speaks against primary thrombocytopenic purpura. Examination of the bone marrow is usually diagnostic. The typical picture is an increase in the number of immature megakaryocytes without platelet formation, apparently due to the inhibiting effect of the spleen upon their maturity and release from the bone marrow into the peripheral blood. Other views as to the cause of thrombocytopenic purpura are that it is due to excessive destruction of platelets by the spleen or to abnormality of the capillaries. It has been noted in microscopic observation of nail bed capillaries that normal capillaries retract quickly on injury, but the capillaries of persons affected with certain hemorrhagic diseases, such as the purpuras or pseudohemophilia, are tortuous and do not retract normally. In the presence of thrombocytopenic purpura the capillaries fail to retract normally and the extravasated clot does not form a well contracted coagulum in the wound. The diagnosis of essential thrombocytopenic purpura depends upon recognition of three factors included in its descriptive title, namely: (1) abnormal capillary fragility; (2) thrombocytopenia, and (3) exclusion of the known causes of these conditions.

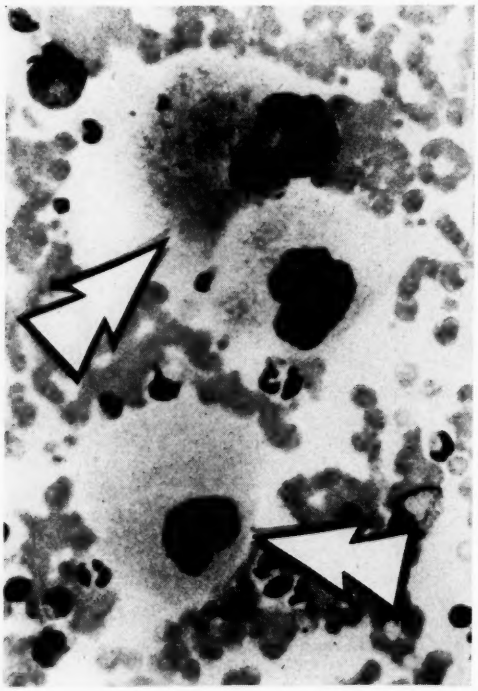


Fig. 8.—Bone marrow smear in a case of thrombocytopenic purpura. Arrows indicate megakaryocytes.

There are three general types of nonthrombocytopenic purpura:

1. *Allergic purpura:* This group includes (a) purpuric manifestations sometimes associated with other manifest allergic disorders and (b) cases in which a definite antigen can be incriminated.

2. *Symptomatic purpura:* This group includes the nonthrombocytopenic purpuras sometimes associated with acute infectious diseases, or following the bite of viperine and crotaline snakes and sometimes following the ingestion of certain drugs, such as belladonna, the iodides, quinine, the salicylates, the anticoagulants and heavy metals such as mercury and bismuth. Purpuric manifestations are sometimes associated with advanced renal and cardiac diseases. Scurvy could be

classified as a form of symptomatic purpura.

3. *Idiopathic purpura:* This group includes nonthrombocytopenic purpura, purpuric bleeding from the gastrointestinal tract (e.g., Henoch's purpura) and the bleeding into the joints, rheumatic purpura of Schoenlein. Occasionally these are classified under the allergic group. Other conditions classed in this group are: purpura anularis telangiectodes, pigmented purpuric lichenoid dermitis, Shamberg's disease, purpura simplex and orthostatic purpura.

Diagnostic Points

Clinical
- Purpuric spots
- No splenomegaly
- Positive tourniquet test
- Bleeding from mucous membranes and body orifices
- Increased capillary fragility

Hematologic
1. Bone marrow:
   Increased number of immature megakarocytes without platelet formation
2. Peripheral blood:
   Low platelet count
   Anemia (if bleeding is pronounced)

Other laboratory data
- Coagulation mechanism
  - Normal coagulation
  - No clot retraction
  - Prolonged bleeding time

THROMBOSIS OR ANOMALOUS OBSTRUCTION OF THE SPLENIC VEIN

The manifestations of chronic obstruction of the splenic vein are similar to those of early Banti's disease, namely splenomegaly, with slight varying degrees of anemia, leukopenia and thrombopenia. Hemorrhage from the esophageal varices is common. Jaundice is usually not present. The bone marrow picture is similar to that of early Banti's disease. Most authors agree that splenectomy cures this condition when performed reasonably early.

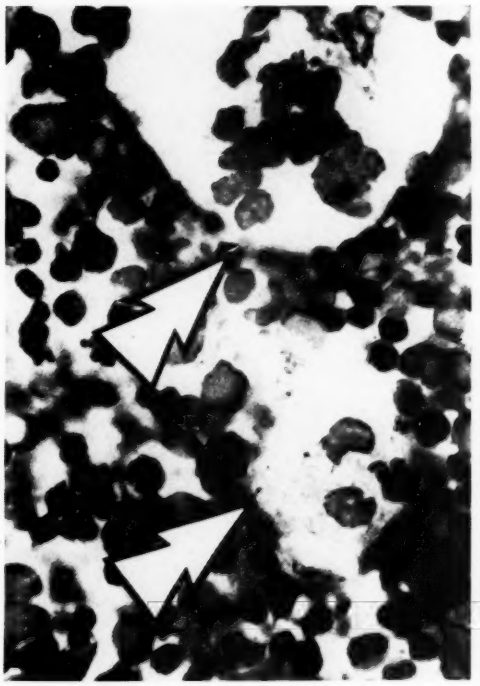


Fig. 9.—Bone marrow smear in a case of Gaucher's disease. Arrows indicate the foam cells.

Diagnostic Points

Clinical
- Splenomegaly
- Hemorrhage from esophageal varices

Hematologic
- Bone marrow:
  Myeloid hyperplasia (maturation arrest)
- Peripheral blood:
  Leukopenia
  Anemia

ACUTE RUPTURE

Acute rupture of the spleen may occur at any age and in persons of either sex. It is most common between the second and fourth decades and is more frequent in the healthy, active male. A history of trauma is always present. The trauma may be penetrating, perforating, crushing, or by direct force, usually applied over the upper left abdominal quadrant.

Associated injuries are common and often overshadow the ruptured spleen. The patient must be examined and evaluated very carefully.

Symptoms.—The symptoms are (1) pain and tenderness over the upper left quadrant and (2) pain in the left scapula or shoulder.

Physical Examination. — This reveals (1) muscle guarding of the upper left quadrant and (2) signs of intra-abdominal hemorrhage, such as shock, rapid pulse, pallor, thirst, falling of blood pressure and shifting dullness.

Laboratory Data.—A scout film of the abdomen will usually show the four cardinal points of rupture of the spleen, namely: (a) gastrectasia (gaseous dilatation of the stomach); (b) serration along the greater curvature of the stomach; (c) obliteration of the splenic shadow, and (d) inferior displacement of the splenic flexure.

DELAYED RUPTURE

After an injury to the back or the lumbar area of the anterior abdominal wall, which may be so mild that the patient forgets the accident, there may be more or less pain, with some nausea and perhaps even mild shock. After several hours these symptoms disappear completely, or at most only leave a vague discomfort in the upper part of the abdomen. The patient then enters the so-called latent period and is able to be up and around. The minimum length of the latent period should be about forty-eight hours, though it may be longer. The latent period, of course, depends upon the massiveness of the hemorrhage and the extent of the splenic laceration.

Symptoms. — The principal symptoms are (1) pain and tenderness over the upper left abdominal quadrant and (2) pain in the left scapula or shoulder.

Physical Examination.—The signs disclosed are (1) tenderness over the upper left quadrant, and occasionally muscle guarding; also (2) there may be slight abdominal distention.

Laboratory Data.—Roentgen study reveals (1) gastrectasia (gaseous dilatation of the stomach); (2) serration along the greater curvature of the stomach; (3) obliteration of the splenic shadow, and (4) occasionally an inferior displacement of the splenic flexure of the colon. The white blood cell count shows leukocytosis, depending upon the size of the hemorrhage. The red cell count indicates anemia, depending on the size of the hemorrhage.

GAUCHER'S DISEASE

This disease was first described in 1882. Its primary pathologic feature is the deposition of large amounts of lipoid material in the spleen, bone and lymph nodes. It is more common in young females of the Jewish race than in other categories. It is characterized by a moderate degree of anemia; invariable leukopenia; a tendency to bleeding of the nose; a brownish-yellow pigmentation of the skin; frequently a yellow, wedge-shaped thickening of the conjunctiva on both sides of the cornea; a moderate amount of enlargement of the liver (in the later stages of the disease), and an enormous enlargement of the spleen, which is frequently the presenting symptom. This disease may affect more than one member of a family. Bone changes are common. The chief of these are an angular deformity of the spine; thickening of some of the long bones and pathologic fracture; also a rarefaction of most bones of the skeleton, including the vertebra, so that the stature may be stunted; a fusiform or clubbed lower third of the femur with some flattening of the femoral head. Etiologically the bone marrow appears to be just as important as the spleen, which explains why splenectomy is only palliative. Occasionally panhematopenia develops. When this occurs splenectomy is definitely indicated. In the absence of panhematocytopenia, splenectomy is rarely indicated in the later stages of this disease. The only relief gained is that of comfort, due to removal of the weight and pressure of the spleen.

Diagnostic Points

Clinical

Splenomegaly
Tendency to bleeding
Yellow pigmentation of the cornea
Yellowish brown discoloration, chiefly about the face and neck
Enlargement of the liver
Thickening of the long bones

Roentgenographic

Angular deformity of the spine
Pathologic fractures
Rarefaction of most of the bones of the skeleton, including the vertebrae
Clubbing or fusiform thickening of the lower third of the femur
Flattening of the head of the femur

Hematologic

1. Observations in bone marrow:

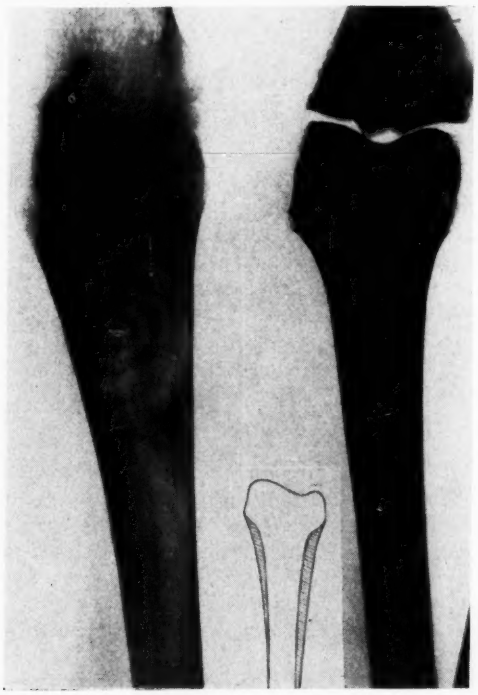


Fig. 10.—Roentgenogram of the femur in a case of Gaucher's disease. The "Erlenmeyer flask" shape is demonstrated.

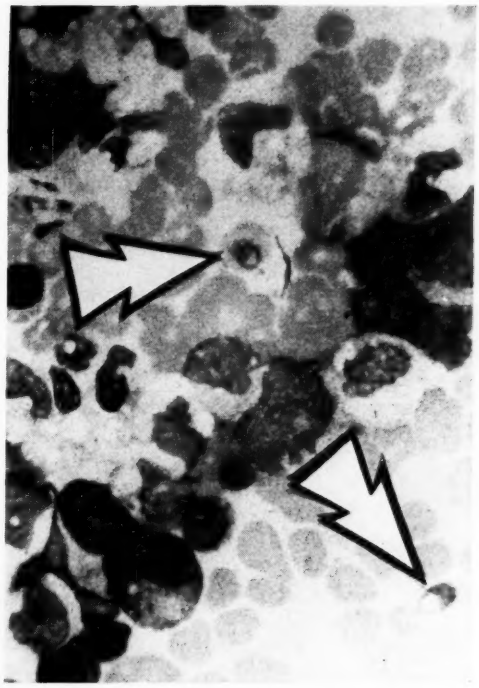


Fig. 11.—Bone marrow smear from a case of malaria. Arrow indicates a parasite.

Foam cells or Gaucher's cells (these are diagnostic)

2. Peripheral blood:
Leukopenia
Varying anemia
Occasionally panhematocytopenia

CYSTS, PRIMARY TUMORS AND ABSCESSES

Although these lesions are frequently cured by splenectomy, the diagnosis is exceedingly difficult and is usually made only by exclusion. Many of these cysts are true cysts of the dermoid or lymphangiomatist type. Eighty per cent are false cysts of the hemorrhagic type, usually the result of trauma, parasites or inflammation. Abscess of the spleen is rare. Its diagnosis is almost impossible. If the spleen is not densely adherent, it should be removed; otherwise drainage may be the procedure of choice.

PTOSIS

Occasionally the spleen may fall from its original position and become enlarged, either primarily or as a result of some associated condition, such as one of the congestive splenomegalies. When this occurs there is a sense of fullness and pressure in the abdomen. Relief of the pressure symptoms may be gained by splenectomy.

MALARIA

Occasionally splenectomy is indicated in the treatment of chronic malaria. One of the first symptoms is pressure due to the enlargement of the spleen. Splenectomy is permissible to relieve the symptoms only when the disease has been completely eradicated. When recurrent attacks of malaria develop in spite of adequate therapy and a large spleen is present, splenectomy is justifiable.

SUMMARY

The author presents an exhaustive survey of diseases of the spleen amenable to surgical treatment, with emphasis on points of diagnosis. Indications and contraindications for operation are outlined. The laboratory tests and procedures are described, including studies of the blood and the bone marrow. The clinical picture of each pathologic entity is examined. The accompanying table summarizes the points useful in diagnosis.

ZUSAMMENFASSUNG

Der Verfasser gibt einen umfassenden Ueberblick ueber Milzerkrankungen, die chirurgischer Behandlung zugaenglich sind; er hebt Punkte hervor, die in der Diagnosestellung nuetzlich sind und umreisst die Indikationen und Gegenindikationen zur Operation. Er beschreibt die angewandten Laboratoriumsuntersuchungen und verfahren einschliesslich der Blutund Knochenmarksstudien und gibt eine Darstellung der klinischen Bilder der einzelnen pathologischen Zustaende.

RÉSUMÉ

L'auteur présente dans le travail un exposé très détaillé des maladies de la rate qui peuvent se traiter chirurgicalement; l'auteur insiste sur certains détails très utiles au diagnostic. On détermine aussi les indications et les contre-indications opératoires. On décrit encore les tests de laboratoire, les procédés employés et les analyses du sang et de la moelle osseuse. On y inclue aussi la description clinique de chaque entité morbide.

RESUMEN

Se presenta una revisión completa de las enfermedades esplénicas susceptibles de tratamiento quirúrgico, insistiendo sobre puntos útiles para el diagnóstico. Se señalan las indicaciones y contraindicaciones operatorias. Se describen las pruebas y procedimientos de laboratorio empleados, incluyendo estudios hemáticos y de médula ósea. Se incluye el cuadro clínico de cada padecimiento.

RIASSUNTO

L'A. presenta un esame esaurito delle malattie della milza risponsabile al trattamento chirurgico, con enfasi sui punti vantaggiosi nella diagnosi. Delinea l'indicazioni e contra-indicazioni operatorie. Descrive gli esami laboratori e procedimenti impiegati, compresovi studi del sangue e midolla ossea. Il quadro clinico di ogni entita' patologica e' incluso.

SUMÁRIO

O autor apresenta um exaustivo estudo de doenças do baço suscetiveis de tratamento cirúrgico realçando os pontos capitais para o diagnóstico. As indicações e contra-indicações operatórias são estabelecidas. Os exames de laboratorio e os processos empregados são descritos, incluindo estudos de sangue e medúla óssea.

O quadro clinico de cada entidade patológica é incluido.

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Study of Breast Secretion for Detection of Intramammary Pathologic Change and of Silent Papilloma

DUDLEY JACKSON, M.D., F.A.C.S., AND DAVID A. TODD, M.D., F.A.S.C.P., AND PAUL L. GORSUCH, M.D.

SAN ANTONIO

THE purpose of this paper is to describe what we believe to be a valuable diagnostic aid in detection of the "silent," or early, papilloma of the breast. It is based on the cytologic study of fluid expressed from the nipple during routine breast examinations. This preliminary report embraces a series of 3,013 patients who, in the seven-year period from 1942 through 1949, came to the office complaining of some type of mammary disorder. We wish to make it clear in the beginning that this is in no way a test for mammary cancer, but merely a method for early detection of breast papilloma, a lesion which we, with many eminent pathologists and surgeons, believe to be premalignant.

The technic of examination is as follows: With the patient lying on the examining table, the breast is supported by the left hand without trauma. The nipple is then grasped firmly at its base with the thumb and index finger of the right hand. The fluid contained in the ducts of the nipple is then milked to the surface by rolling the thumb and finger against each other toward the tip of the nipple. This must be done in three or four different axes in order that no ducts may be missed. The secretion thus obtained is then touched to a slide. A second slide is placed flat against the first and slid lengthwise without pressure to distribute the fluid evenly. The slide is immediately placed in a mixture of equal parts of 95 per cent alcohol and ether and thereafter prepared according to the technic described by Papanicalaou for cervical smears. One of us (Dr. Todd) has found that hematoxylin and eosin stains give him his best results.

In this group of 3,013 patients there were 2,109 or 70 per cent, who had no pathologic condition demonstrable, either by physical examination or by cytologic study.

There were 1,309 from whose nipples we were able to obtain secretions during either the initial or subsequent examinations. Several patients were examined more than once; in fact, the secretions of some were examined as many as fifteen times. Others had either only one breast, postoperatively, or more than two breasts. In 1 instance a woman presented herself with six breasts, and fluid was obtained from five.

The color and consistency of the secretions obtained were noted. The color varied from pearl, light green, turquoise green, milk-colored, dark brown to almost black, serosanguinous to frank blood. The consistency ranged from thin and watery through thick and oily material to the semisolid comedo type associated with comedomastitis.* The amount varied from a small drop to a cubic centimeter or more.

Early in our observations it was noted that secretion from one quadrant of a breast might be in the normal range, whereas another quadrant would produce, for example, a dark green or a frankly bloody fluid. In this manner we could localize rather definitely the quadrant containing a papilloma.

Submitted for publication Oct. 8, 1950.

*The consistency of breast secretions and their significance was studied and recently reported by Beasley of Atlanta and Donnelly of the University of Iowa in two excellent papers.

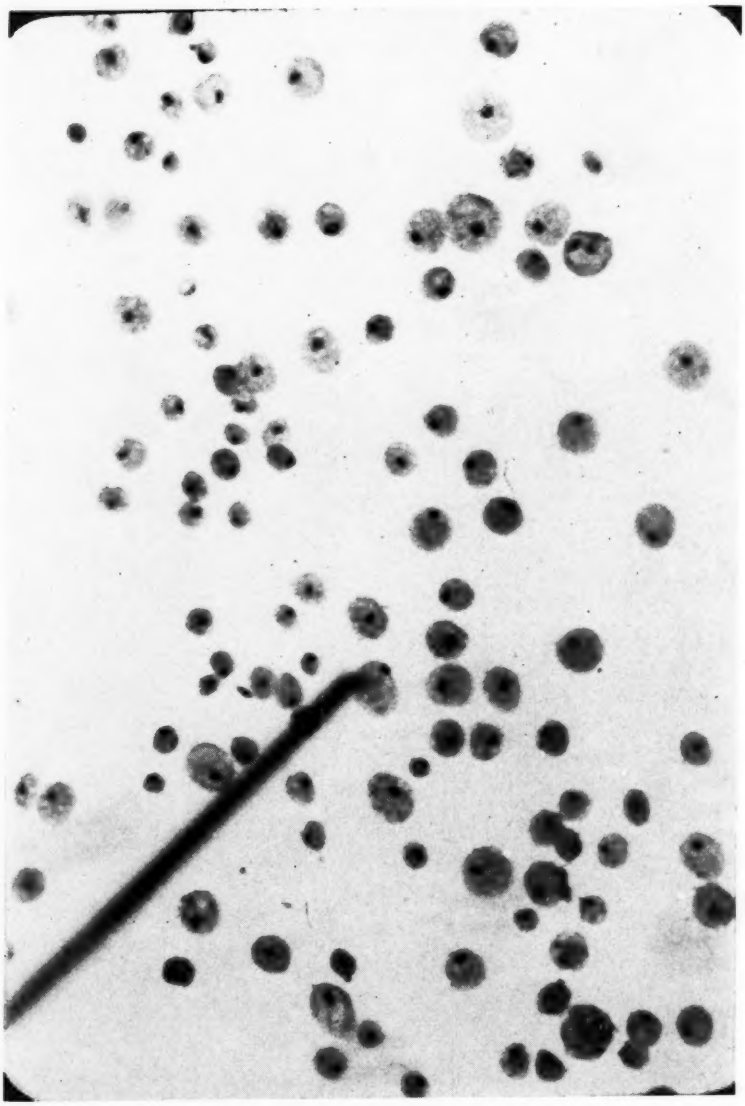

Fig. 1.—Normal exfoliated cells. Note variable size but uniform shape; small nuclei, usually eccentric. Cytoplasm pink-staining granular. Hematoxylin and eosin stain; × 160.

In 160 cases the existence of an intraductal or intracystic papilloma was confirmed either microscopically or grossly in the resected quadrant of breast. The patients had either a thin and watery, a serosanguinous or a frankly bloody fluid.

In addition, we have been able to classify secretions from 217 patients as showing definite epithelial hyperplasia. This group has been closely and carefully followed; and we have been rewarded by observing in several instances the later

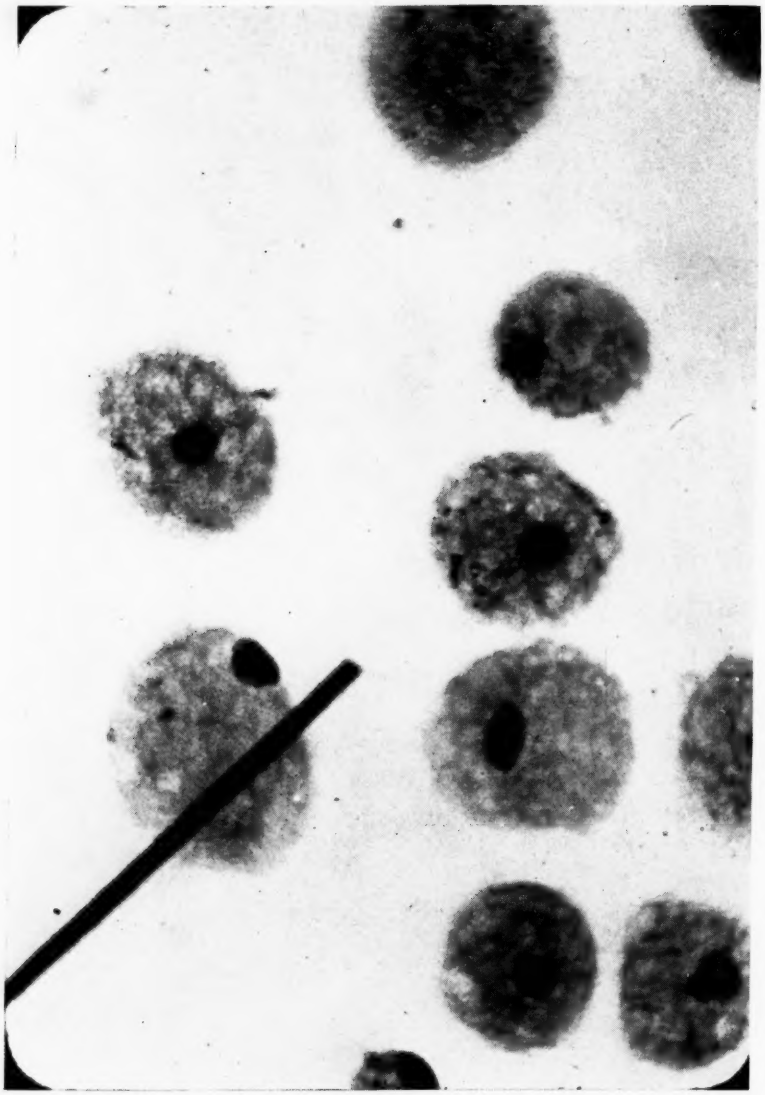

Fig. 2.—Same as Figure 1 but higher power (× 440). Hematoxylin and eosin stain.

development of definite tumors, that is, cysts, fibroadenomas, 1 papilloma and 1 early carcinoma. With this test we have detected definite pathologic lesions which otherwise would not have been discovered, even by the most careful physical examination of the breast. Our primary purpose, however, is to discover the papilloma early, before it manifests itself as a palpable tumor mass or is suggested by a bleeding nipple. With this test we were able to detect the presence of a silent papilloma in 46 per cent of the cases by cytologic examination of the secretion be-

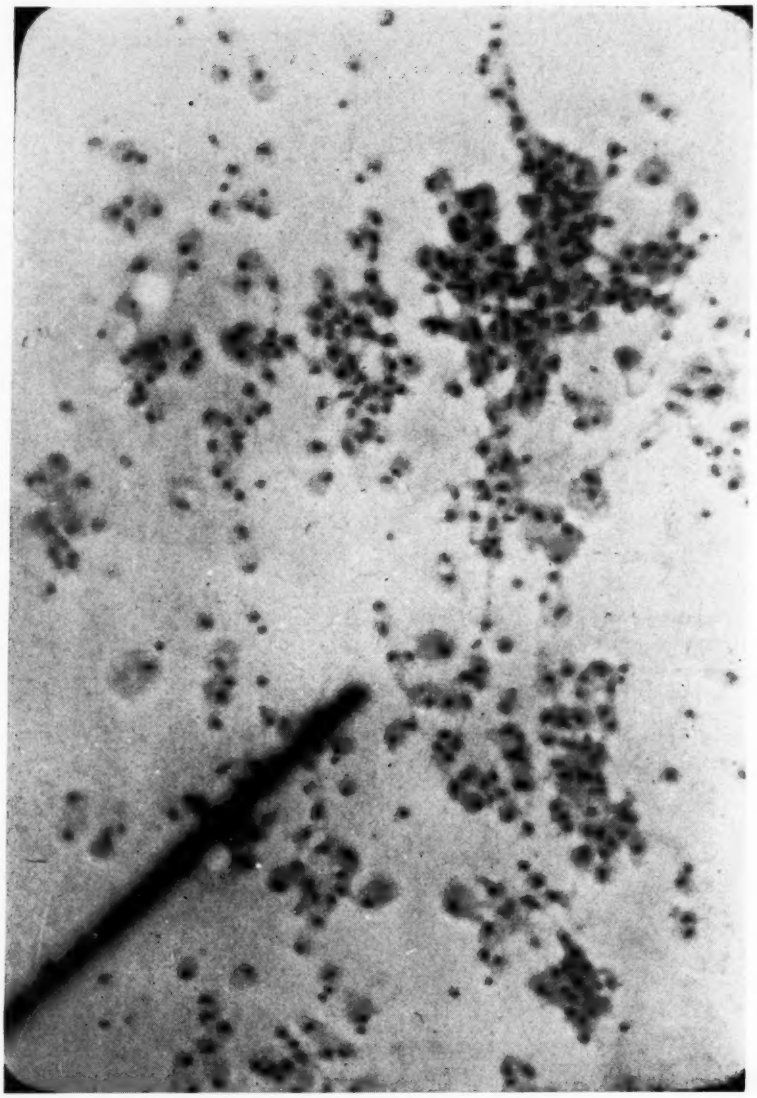

Fig. 3.—Adherent clusters of cells exfoliated from areas of hyperplasia. Hematoxylin and eosin stain; × 160.

fore visible bleeding had occurred at all.

Our greatest responsibility lay in telling 2,109 women that there was no demonstrable disease in the breast. This cytologic study of breast secretions gives us greater confidence when it becomes necessary to make this serious statement.

Early in our work we had considerable difficulty in distinguishing between the normal and the abnormal exfoliative cell, and, later, in differentiating the true papilloma and the closely related epithelial hyperplasia. We believe that this difficulty now has been overcome.

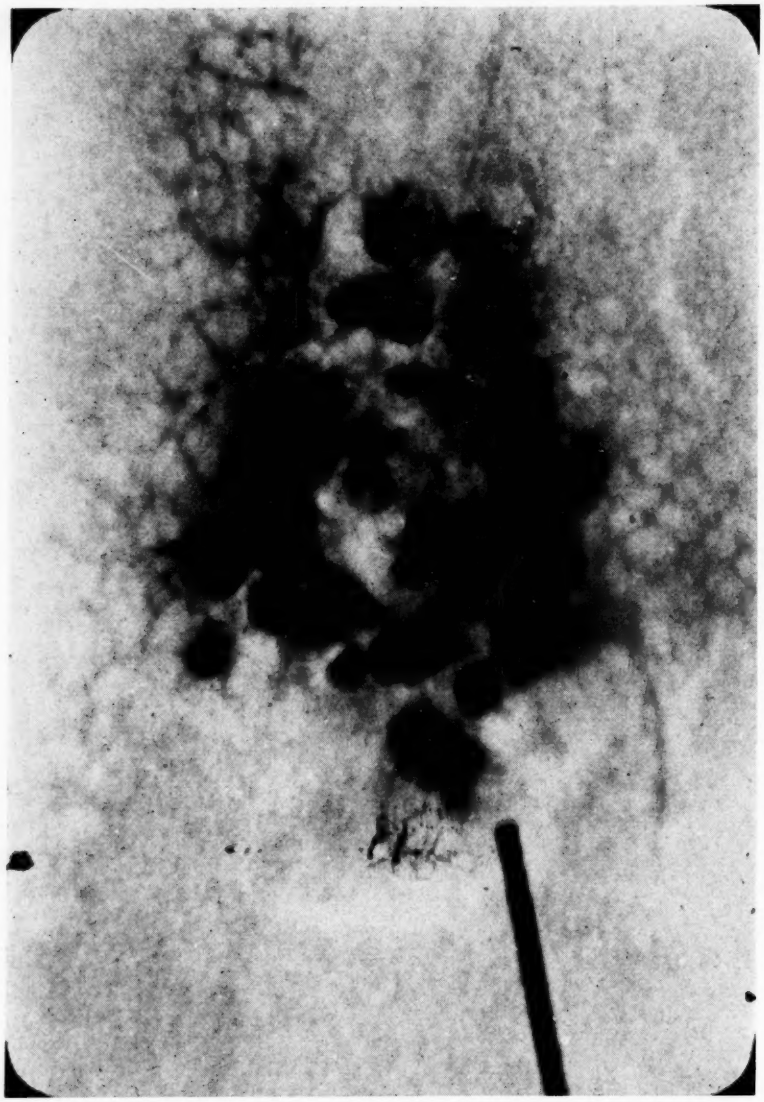

Fig. 4.—Same as Figure 3 but higher power (× 440). Note small size but generally uniform shape of cells. Cells loosely adherent; nuclei large in ratio to total cell volume. Hematoxylin and eosin stain.

A bleeding nipple has long been recognized as a danger signal of mammary disease, usually being considered due to an intraductal papilloma or carcinoma. It is an untrustworthy sign and must not be placed in the dangerous category of conditions to be handled by "watchful waiting." We have found that the bleeding nipple is only a fortunate accident, in that it calls the patient's attention to the presence of a pathologic condition in the breast. Our experience confirms the opin-

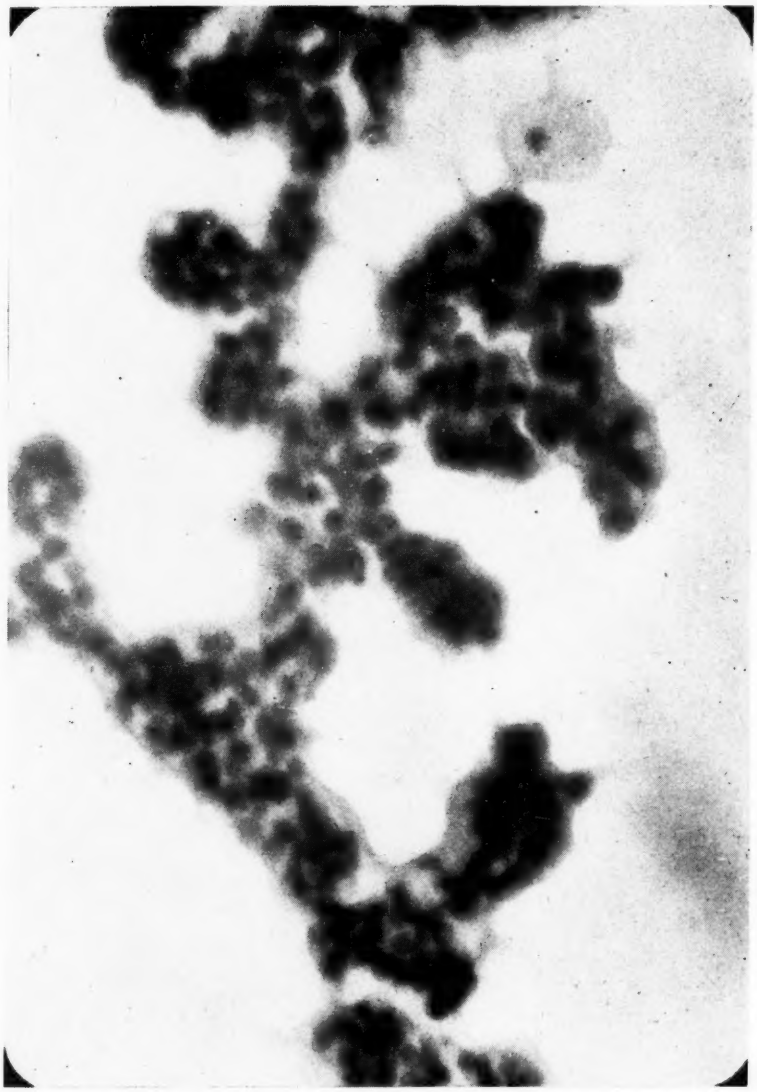

Fig. 5.—Branching stalk or frond from benign papilloma. Classic pattern. Hematoxylin and eosin stain; × 160.

ion of Howard K. Gray of the Mayo Clinic and Herbert C. Chase of New York, that in many instances malignant change has already occurred when bleeding becomes visible. On the basis of our cytologic studies and microscopic examinations, we feel that cancer frequently develops at the base of a papilloma, or in close proximity thereto, without any demonstrable symptoms or signs. Our technic is a method of detecting these papilloma before bleeding is evident and probably before malignant change occurs.

Cancer seldom develops in a healthy

Fig. 6.—Papillomatous cluster of fronds. Classic pattern. Hematoxylin and eosin stain; × 160.

skin or mucous membrane without pre-existing epithelial hyperkeratosis or leukoplakia. It is a well established fact that cancer frequently develops at the bases of polyps of the colon and papillomas of the bladder. To us it seems equally certain that cancer is more likely to develop in a breast where epithelial hyperplasia or papilloma are present than in a completely normal breast.

Four hundred and forty microscopically proved carcinomas of the breast operated

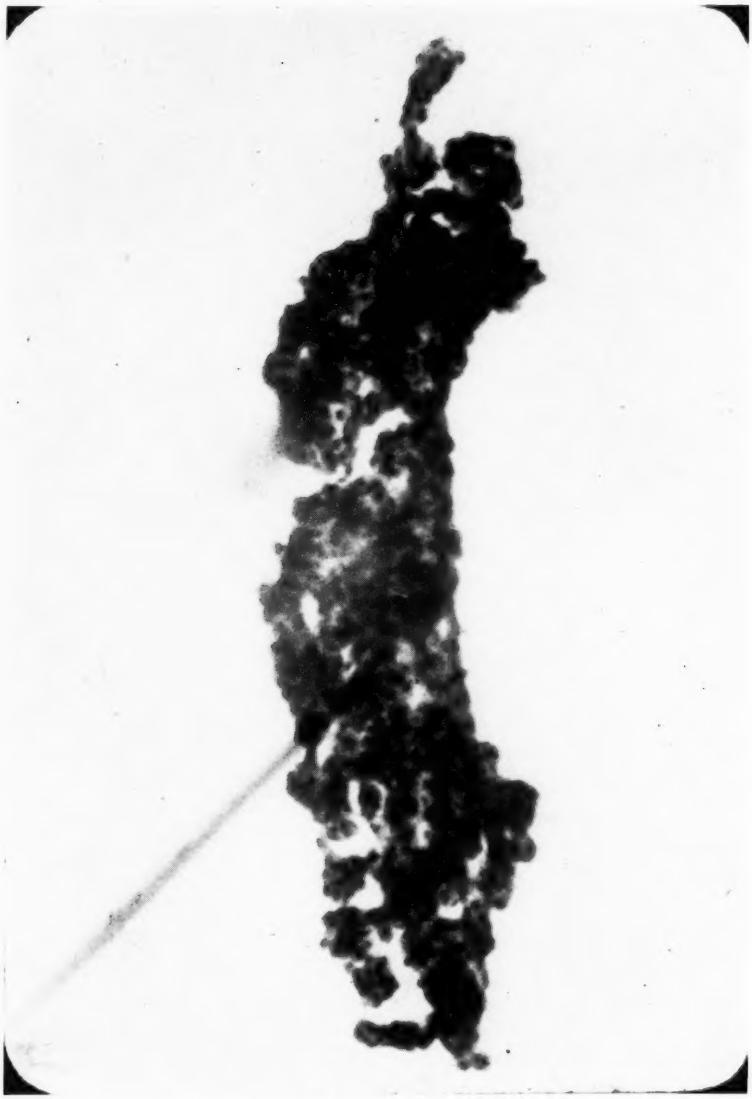

Fig. 7.—Large papillomatous cluster. Hematoxylin and eosin stain; × 160.

on by the senior author during the last seven years are being studied; 189 consecutive cases in this series have been statistically reviewed and in this group there were 66 coexistent intraductal papillomas or papillary cystadenomas.

In a series of 365 mammary papillomas reviewed by Arthur Purdy Stout and Jim Phillips, including all tumors diagnosed as papillomas in the Presbyterian Hospital from 1916 to 1941, there were 129 instances of coexistent cancer. This is an astonishing and alarming proportion and speaks for the seriousness of the disease

Fig. 8.—Papillomatous cluster shown in Figure 6, higher power. Note dense clustering, small size of cells, large hyperchromatic nuclei, uniformity of cell size and shape. Hematoxylin and eosin stain; × 220.

and the necessity of its early recognition.

A letter has been received from Dr. Rupert Willis, pathologist at the Royal Cancer Hospital in London, concerning this problem. We quote: "With regard to the malignant potentiality of breast papilloma, my view is very similar to that explained in Cheatle and Cutler's book, namely, that while there do occur quite localized simple papillomas in the larger ducts which can be removed successfully and do not recur, it is more frequent to

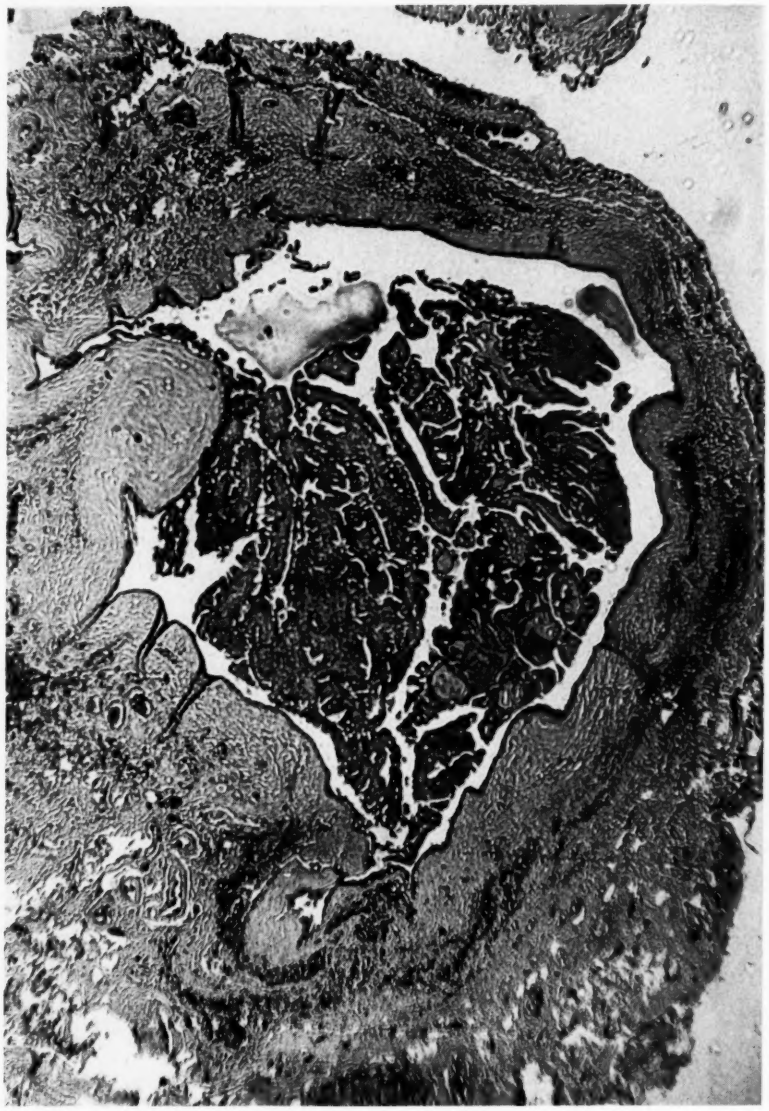

Fig. 9.—Section of duct showing papilloma in situ, × 50.

(AUTHOR'S NOTE: *This photomicrograph and the three to follow, Figures* 10, 11 *and* 12, *are presented in association with Dr. C. M. Pomerat, Professor of Cytology, University of Texas, Medical Branch, Galveston. The National Cancer Institute has made available a grant to continue this investigation, in collaboration with Dr. Pomerat. The four photomicrographs show low and high powered views of the histologic structures of the papilloma from which these tissue cultures were obtained. Illustrations* 11 *and* 12 *show the growth of the papilloma in tissue culture*).

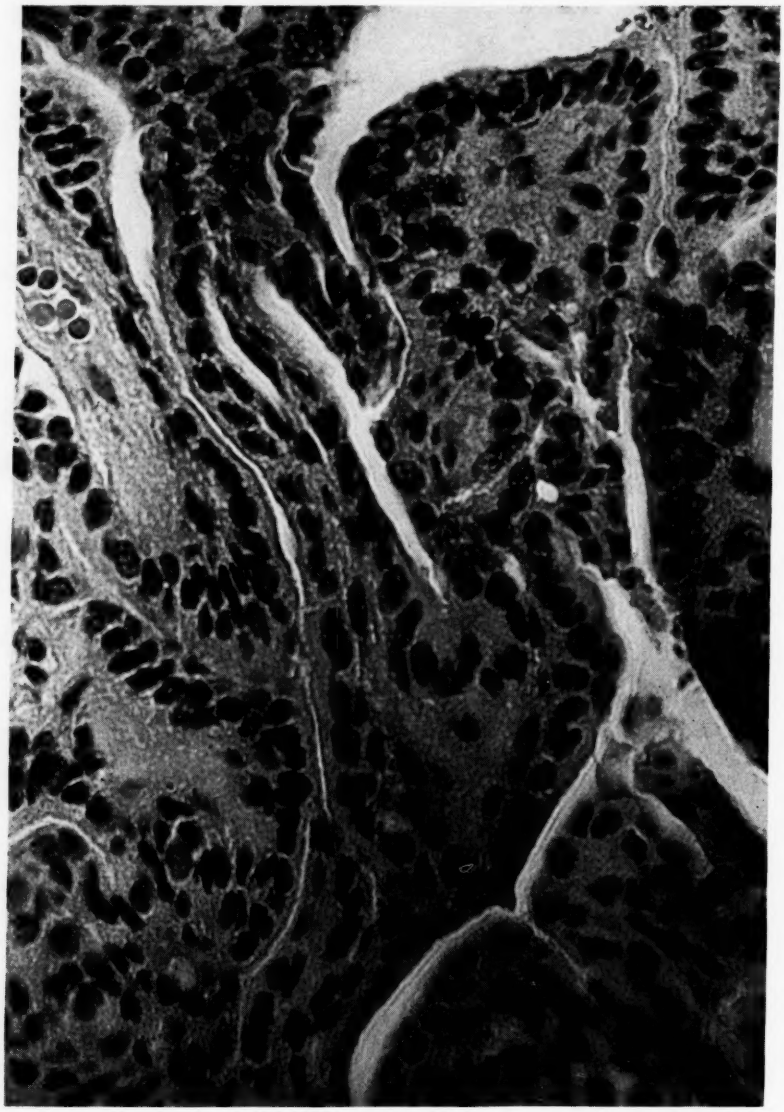

Fig. 10.—Appearance of papilloma shown in Figure 9 in histologic section; × 500.

encounter multiple papillary growths involving the ducts over a considerable extent, and these are prone to evolve into intraductal cancer which eventually becomes infiltrative. There is little doubt, I think, that most papillary growths in the breast, as in most other situations, are a stage in the evolution of malignancy and should be treated as such."

The simple expression of secretion from a nipple does not, in any way, traumatize cancer some distance from the nipple. It is conceivable that an intraductal carcinoma of the nipple, or the lesions of

Fig. 11.—Sheet of epithelial cells growing from an explant of papillomatous tissue after twelve days of incubation. Stained with Jacobson's (May-Grunwald-Giemsa) combination; × 100.

Paget's disease, could be traumatized; but in these cases the nipple is rigid, indurated or retracted, mechanically preventing one from traumatizing the lesion. As a matter of fact, in most breast carcinomas the duct system is so involved in the disease, even when the lesion is located in the periphery, that this secretion is unobtainable.

The surgical treatment we use for papil-

Fig. 12.—Outgrowth of epithelial cells from papillomatous explant, × 500. Note uniform size and characteristics of nuclei at junction of epithelial sheet with explant (solid black mass).

loma consists of a wedge-shaped quadrant resection with complete and exceedingly careful excision of the interior of the nipple.

At present we are also studying secretions obtained from a group of normal young women. Smears are taken three times a week and the cellular observations correlated with their menstrual cycles. Dr. C. W. Pomerat, at the University of Texas, is making tissue cultures of breast secretions from the same group. A future re-

Fig. 13.—Photograph showing normal pearl-colored fluid.

port will include the results of these two studies.

SUMMARY AND CONCLUSIONS

1. A method is described by which a silent papilloma, often a premalignant lesion, can be discovered before the classic sign of the bleeding nipple is present.

2. Excessive intraductal epithelial hyperplasia is also detectable, and is considered by the authors a sign of future pathologic change in the breast.

3. No examination of the breast is complete without a thorough cytologic study of the mammary secretion.

4. If it is granted that a papilloma is often a premalignant lesion and should be removed, a method to detect the silent papilloma before it bleeds, or is suspected for any other reason, justifies this study.

RÉSUMÉ

1. Une méthode est decrite par laquelle un papillome silencieux qui est souvent une lésion prémaligne peut être reconnu avant que le signe classique d'hemorrhagie due mamelon soit présent.

2. Une hyperplasie épithéliale intraductale excessive peut aussi être reconnue et est considerée par les auteurs un signe de pathologie future du sein.

3. Aucune examen du sein n'est complet sans une étude cytologique à fond de la sécretion mammaire.

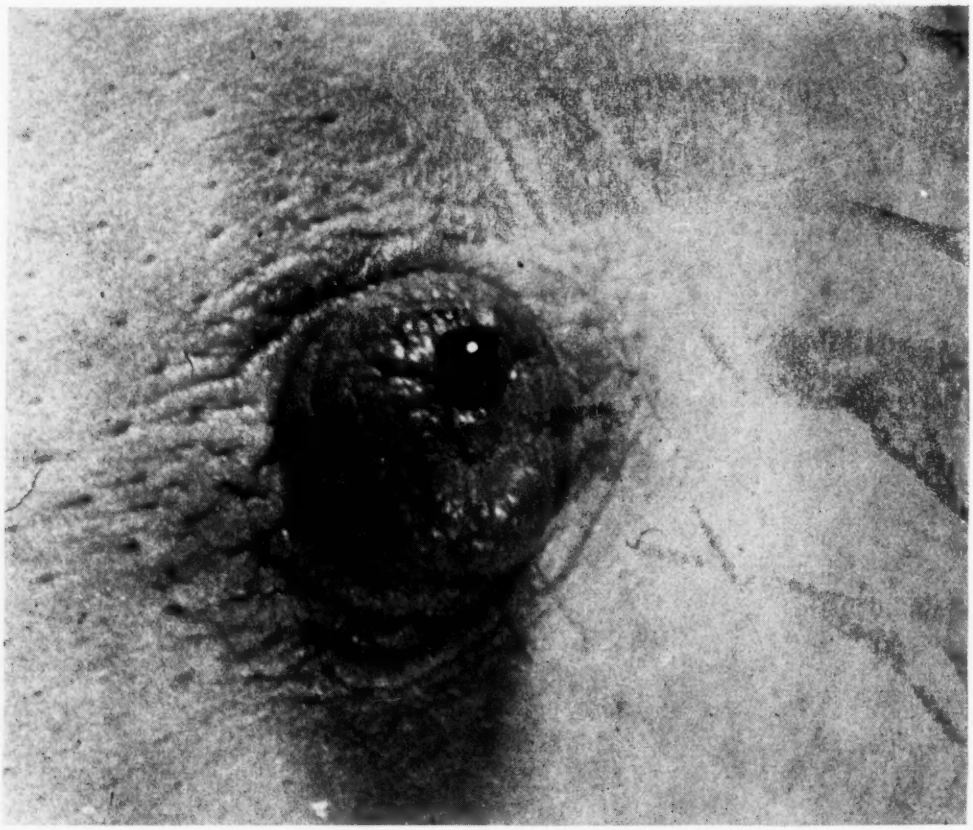

Fig. 14.—Photograph showing bloody fluid, usually diagnostic of papilloma.

4. Vu qu'un papillome est souvent une lesion prémaligne et doit être enlevé, une methode pour reconnaitre le papillome silencieux avant qu'il saigne, ou s'il est soupconne pour d'autres raisons justifie cette étude.

RIASSUNTO

1. Descrivono un metodo capace di rivelare la presenza di un papilloma prima della comparsa del sintomo classico, cioe' una secrezione ematica dal capezzolo.

2. Questo metodo consente la scoperta di un'eccessiva iperplasia epiteliale nei dotti galattofori: iperplasia che gli AA. ritengono la prima fase di ulteriori e piu' gravi lesioni neoplastiche della mammella.

3. L'esame della mammella non e' naturalmente completo senza un accurato esame microscopico della secrezione mammaria.

4. Questo nuovo metodo deriva la sua importanza dal fatto che i papillomi rappresentano spesso un'affezione precancerosa e vanno—come tali—sempre asportati.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. Eine Methode zur Entdeckung ruhender Papillome (einer haeufig praemalignen Erkrankung) vor dem Auftreten des klassischen Zeichens der blutenden Brustwarze wird beschrieben.

2. Auch uebermaessige Hyperplasie des Epithels der Druessengaenge kann ent-

deckt werden. Dieser Zustand wird von den Verfassern als ein Anzeichen spaeterer Krankheitsveraenderungen in der Brust angesehen.

3. Keine Untersuchung der Brust is vollstaendig ohne ein sorfaeltiges zytologisches Studium der Brustdruesensekretion.

4. Wenn anerkannt wird, dass ein Papillom haeufig eine praemaligne Erkrankung darstellt und entfernt werden sollte, dann erscheint diese Arbeit, die eine Methode zur Entdeckung eines ruhenden Papilloms vor Auftreten einer Blutung oder beim Vorliegen irgendwelcher Verdachtsmomente angibt, gerechtfertigt.

RESUMEN Y CONCLUSIONES

1. Se describe un método por el que un papiloma asintomático, frecuentemente una lesión precancerosa, puede descubrirse antes de presentarse el signo clásico del pezón sangrante.

Fig. 15.—Photograph showing straw-colored fluid from papilloma.

2. La hiperplasia epitelial intracanalicular excesiva es también revelable, siendo considerada por los autores como signo de mutación patológica futura en la mama.

3. Ningún examen de la mama es completo sin estudio citológico completo de la secreción mamaria.

4. Si se acepta que un papiloma es frecuentemente una lesión precancerosa y se extirparía, un método para descubrir el papiloma asintomático antes de sangrar, o sospechado por cualquier motivo, justifica este estudio.

SUMÁRIO

1. Descreve-se um método pelo qual o papiloma silencioso, muitas vezes uma lesão premaligna, póde ser descoberto antes que o signal classico de mamilo sangrante seja observado.

2. Excessiva hiperplasia epitelial e intraductal é igualmente destacavel e é considerada pelos autores como um sinal de futuras alterações patológicas nas mamas.

3. Nenhum exame dos seios é satisfatorio sem uma análise citologica da secreção mamaria.

4. Si admitirmos que o papiloma é muitas vezes uma lesão pre-maligna e que deva ser removido, um método para descobrir o papiloma silencioso antes que ele sangre ou que seja suspeitado por qualquer outra razão justifica seu estudo.

Announcement

International Board of Occupational Surgery

The Executive Council of the United States Chapter and the Board of Trustees of the International College of Surgeons have unanimously approved the formation of an International Board of Occupational Surgery, the aims of which are (*a*) elevation of standards for the practice of occupational surgery, (*b*) conservation of the health of the worker after occupational injury, (*c*) official recognition of this specialty, (*d*) stimulation of interest in this field by students and members of the profession, and (*e*) cooperation in the establishment of facilities for graduate education in occupational surgery by means of residencies in hospitals affiliated with medical schools, or their equivalents.

Frederick W. Slobe, M.D., F.A.C.S., F.I.C.S., Chairman

E. C. Holmblad, M.D., F.A.C.S., Secretary

For further details, address Dr. Arnold S. Jackson, Secretary, United States Chapter, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Endocrine Therapy in Gynecologic Practice

JACOB KOTZ, M.D., F.A.C.S., F.I.C.S.* AND MORTON S. KAUFMAN, M.D.**
WASHINGTON, D. C.

TWO decades ago a discussion of the endocrine treatment of menstrual disorders would have been necessarily brief, as the only endocrine products available for treatment were thyroid, ovarian and corpus luteum tablets.

The treatment of amenorrhea in those days was a simple matter; the patient was told that to menstruate was not important and to forget it. The patient with dysmenorrhea was advised to get married and, if married life did not relieve the menstrual cramps, she was told to get pregnant.

The treatment of sterility in the female was equally simple. First, a dilatation and curettement was done. If after several months pregnancy did not follow, another was advised. I have seen patients who had had as many as ten such operations. Finally, a laparotomy was recommended.

In 1950 we are still floundering in our treatment of functional disorders, but the science of endocrinology has moved along steadily. Highly potent preparations are available and if not properly used can be harmful. We must therefore learn not only when to use them but when not to use them.

Functional Bleeding. — Perhaps the most common functional complaint encountered by the gynecologist is functional uterine bleeding. In the past the treatment was quite simple. It consisted of the use of ergot; next came radium, and finally operation.

Today the management of the patient with functional bleeding is by no means a simple problem. Many potent endocrine products are available, but even with their aid one is sometimes forced to resort to radium or surgical intervention.

Practically, there are two types of functional bleeding: (*1*) excessive regular flow and (*2*) too frequent and prolonged flow.

In selecting a plan of treatment, the age of the patient should be considered. In the management of bleeding both in puberty and in maturity it is important to conserve the reproductive functions. Bleeding in a woman past the childbearing age is usually approached by a preliminary curettage to rule out malignant disease and then treated by the intrauterine application of radium. However, hysterectomy is preferable to radium when interpretation of the microscopic examination is in doubt or when there appears some other indication for laparotomy.

The management of bleeding in puberty and in maturity can, for the purpose of our discussion, be divided into two parts: (1) control of bleeding when the patient is first seen, and (2) prevention of recurrence.

Many methods have been used to meet both indications, but no single agent is effective in every instance of functional bleeding. When the bleeding is so great as to exsanguinate the patient, one or more transfusions followed by curettage are in order. When the condition is good, one can afford to take sufficient time to examine the patient thoroughly. This should include vaginal cytologic study, basal metabolism test, complete blood count, etc. Malignant disease should be ruled out, irrespective of the patient's age. It may not always be possible to hospitalize the patient for curettage; thus valuable time may be lost. The vaginal smear technic offers a rapid and simple method for ruling out malignancy. It should not take the place of cervical or endometrial

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biopsy, but it is of tremendous diagnostic value.

The vaginal smear technic is also of value in determining the choice of hormones to be used. If the vaginal cornification count is high, androgen by itself or in combination with progesterone is the treatment of choice. We use 25 mg. of testosterone with 25 mg. of progesterone, parenterally, daily for 3 to 7 doses. The patient is cautioned that two to four days later there will be a recurrence of bleeding, which will last for three to four days and then stop either suddenly or gradually.

Our endocrine treatment from this point consists in the use of testosterone proprionate in 25 mg. doses with 10 mg. of progesterone daily for the first three to four days of the next three or four periods.

When the cornification count is low we use 5 to 10 mg. of estrone sulfate (premarin) daily for twenty days. This is followed by 50 to 100 mg. of progesterone linguets daily for ten days. If bleeding occurs during treatment the drug is discontinued, but the estrone sulfate is resumed on the fourth or fifth day of bleeding. This treatment is continued for about three to four cycles. An endometrial biopsy is done on the first day of the fourth cycle, and if secretory endometrium is found treatment is discontinued.

Should the cornification count be normal, progesterone is the medicament of choice. Twenty-five to fifty mg. of progesterone in sesame oil is given every day until bleeding is controlled. Here again, when therapy is withdrawn the patient will bleed for several days, and a sort of medical curettage takes place. In an effort to regulate the cycle, 50 to 100 mg. of progesterone, given buccally or sublingually, should be administered daily for three to five days during at least three to four succeeding periods.

One should not be too hasty in condemning the endocrines. Subminimal pathologic change is often present which cannot be ruled out by the usual pelvic examination.

Gonadotropins have proved disappointing in the treatment of functional bleeding. Only a small percentage will respond to such therapy. Once the immediate attack is under control, attention should be given to the general condition of the patient. Thyroid therapy should be given whenever the basal metabolic rate is on the minus side. It has been our custom for years to give enough thyroid to maintain the basal metabolism rate at plus 10 to plus 15 in the management of all functional problems in women. Correction of body weight in the obese and the underweight should receive prompt attention; foci of infection should be corrected.

Dysmenorrhea. — Almost every endocrine product available for clinical use has been tried in the treatment of dysmenorrhea. Many have been used indiscriminately, with varying results. But even when due care has been given to the selection of cases and when application has been made of the seemingly appropriate glandular therapy, no one product has been eminently successful in all cases. This should not be too discouraging but should serve to emphasize the fact that there is no one cure for dysmenorrhea and that treatment of each patient must be highly individualized, the problem being attacked from every possible etiologic angle.

Estrogen: Everyone will agree that dysmenorrhea is a disorder of ovulating women and that it is considerably relieved by preventing ovulation. This can probably be accomplished by giving 5 mg. of estrone sulfate (premarin), starting as soon as the period is over and continuing until about the twenty-third day of the cycle. One must bear in mind that this therapy cannot be used for patients who desire to become pregnant. In such cases, we use the androgens. They depress the pituitary and counteract the effects of estrogen.

The dosage and the time of administration have varied widely with different authors. In our experience large doses are not necessary; 10 to 20 mg. given daily by the peroral route during the last phase of the cycle is sufficient. In such

small doses their effects are transitory, and the probability of masculinizing effects is negligible.

There are some who believe that the androgens are not physiologic and should not be used; nevertheless, in our hands, the results obtained with testosterone have been gratifying. One should, of course, be on the lookout for any unpleasant side effects. The androgens should be avoided for women who already have a tendency to hirsutism. The dysmenorrhea of endometriosis, however, may be controlled by androgen therapy in many cases.

Thyroid Extract: Thyroid extract should be used in all cases of dysmenorrhea when the basal metabolic rate is on the minus side. We have obtained very encouraging results in cases of dysmenorrhea associated with malnutrition by using 10 units of insulin daily throughout the cycle and by using thiamin chloride in 100 mg. doses once daily. The insulin and thiamin can be combined in suitable cases with the estrogens or the androgens.

Amenorrhea.—Like all female functional disorders, amenorrhea is merely a symptom, usually the most outstanding symptom as far as the patient is concerned, of either a local or a constitutional disorder.

It may be primary or secondary, functional or physiologic. In all cases of amenorrhea, the condition is due to some disturbance in the pituitary-gonadouterine relationship which prevents the consummation of the normal cyclic changes in the endometrium.

Amenorrhea occurs in hypohormonal conditions in which the anterior pituitary fails to secrete an adequate amount of gonadotropic hormone, or in which the ovary is unresponsive to pituitary stimulation. Amenorrhea may also be seen in hyperhormonal states such as pregnancy, persistent corpus luteum cysts and granulosa cell tumors.

Amenorrhea may be a symptom of various metabolic disturbances associated with thyroid disease, diabetes, obesity, malnutrition, or nervous and psychopathic disturbances. Emotional shock was responsible for many cases of amenorrhea in wartorn Europe, and nutrition played an important part. Amenorrhea is frequently seen in young women after excessive dieting, because the ovaries are sensitive to nutritional deficiencies. Some of the women in concentration camps had amenorrhea for a period varying from six months to a year, others for the entire duration of their internment.

The treatment of amenorrhea may be divided into nutritional, endocrine, radiation and surgical. Irrespective of the underlying endocrine or metabolic causes, one must eliminate foci of infection. Obesity must receive appropriate attention, and the undernourished should have a high caloric diet with insulin in 10-unit daily doses. Thyroid should be given in small doses to bring the basal metabolic rate to plus 10 to plus 15. A change of environment, when possible, is helpful.

The endocrine treatment of amenorrhea is far from satisfactory. For many years we have used roentgen treatment to the pituitary and ovaries, treatments being given at weekly or three-week intervals for a total of three treatments. Kaplan treated 142 women; in 124 patients the menstrual cycle was reestablished; 52 of these women conceived and 50 had normal babies. Seventy-two per cent of Mazer's patients menstruated after radiation therapy, and 54 per cent of the sterile patients in this series were delivered of healthy babies. Now and then the roentgen treatment had to be repeated.

In the past few years, we have combined radiation therapy with various endocrine preparations. When an ovarian pathologic condition, such as tumor or cyst is present, conservative surgical methods are indicated to remove the cause of the amenorrhea and permit the remaining ovarian tissue to function normally.

It is not necessary to institute endocrine therapy before a girl reaches the age of seventeen. Without treatment most of these patients usually become essentially normal.

The longer the period of amenorrhea, the poorer the results with any type of treatment.

In the hypohormonal states, a sufficient amount of estrogen therapy will induce uterine bleeding, but making a nonovulating women ovulate is quite a different problem.

Zondek's method of treating amenorrhea is as follows: (a) for secondary amenorrhea of two years or less in duration, the patient receives 2.5 mg. of estradial benzoate and 12.5 mg. of progesterone on two successive days; (b) for secondary amenorrhea of more than two years' duration, five daily injections of 10 mg. of progesterone are given; (c) for primary amenorrhea, 1 mg. of estradial benzoate and 10 mg. of progesterone are given daily for five days. Uterine bleeding from an estrogen endometrium follows in a few days. A second and third course of injections is given on the same dates during the following two months.

The Kaufman method consists of giving the patient 2 mg. of diethylstilbestrol or 2.5 mg. of estrone sulfate daily for fifteen days, followed by 60 mg. of pranone (progesterol lutocylol) daily for five days. This course is repeated for three consecutive months, beginning with the cessation of each induced menstrual flow.

The advantage of the Kaufman over the Zondek method is that the patient bleeds from a premenstrual type of endometrium. It should be remembered that the usual patient with amenorrhea has average health but suffers psychically from the impression that all is not well. Therefore, if only the amenorrhea is treated, we prefer the Zondek method, as it brings about results in a shorter time. On the other hand, if the goal is pregnancy, the Kaufman method is preferable.

The therapy, therefore, of secondary amenorrhea is essentially the treatment of the underlying infection, of the organic and metabolic disorder rather than the amenorrhea itself. Thus far, the results obtained with gonadotrophin have been disappointing, primarily because no gonadotrophic preparations are as yet available which are of undoubted efficacy in the human being.

We have employed estrogenic therapy alone or in combination with thyroid in cases of amenorrhea associated with hypoplasia. Here it is our aim to increase the size and vascularity of the uterus to such a point that it can respond to the hormones supplied by the patient's own ovaries. Two and one-half to 3.75 mg. of estrone sulfate is given for twenty days, with a ten day rest period. This program is repeated for several months, and the uterus is checked for any increase in size. This therapy, however, will be of no value when the sexual retardation involves the ovaries as well as the uterus.

In summarizing the treatment of amenorrhea, it should be remembered that one is dealing with a symptom and that treatment should attempt to correct the underlying cause. The therapeutic measures adopted for the individual patient should have a rational basis and should entail no danger to gonadal function.

Premenstrual Tension.—The term "premenstrual tension" was coined by Frank, and it describes a syndrome characterized by an exaggeration of the usual menstrual molimina to the point where they become distressing or incapacitating. For the milder forms, Greenhill and Fried have proposed the term "premenstrual distress." Although it may occur at any time during the menstrual cycle, the severe manifestations we have seen have been mostly in women approaching the menopause.

The outstanding symptoms in the presence of severe involvement are headache, vertigo, irritability, crying spells, transient edema, and occasionally nymphomania and suicidal tendencies.

Since the cause of this condition is unknown, its treatment is necessarily empirical. Frank thought the condition was due to hyperestrenemia and recommended magnesium sulfate, but for women near the menopause he advised roentgen castration. Israel suggested that the cause was a deficient production of progestin and

recommended progestin therapy. Greenhill and Fried held that the condition was the result of sodium ion retention by the different tissues of the body under the influence of ovarian steroids. They recommended reduction of salt in the last two weeks of the cycle, plus the administration of ammonium chloride. Hudgins recommended the use of thyroid. Many have advised the use of Vitamin B, and Cline advised the use of methyl testosterone given once daily for seven to ten days before the onset of menstruation. Novak recommended abolishing menstruation by using radium for patients nearing the menopause.

All doctors see patients whose symptoms are mild and can be controlled by sedatives and laxatives. It is certainly less expensive than the use of androgens and less troublesome than ammonium chloride and a salt-free diet. On the other hand, for severe symptoms, testosterone, administered buccally or sublingually in 10 mg. to 20 mg. daily doses, starting about one week before the expected period, will be helpful, and for patients near the menopause roentgen or radium castration will be effective.

Midmenstrual Pain and Midmenstrual Bleeding.—Midmenstrual pain and midmenstrual bleeding are encountered at reasonably frequent intervals by the gynecologist. Rock has stated that fewer than 5 per cent of all women have sufficient bleeding at the time of ovulation to attract their attention. Papanicolaou observed red blood cells in vaginal smears from 24 per cent of normal menstruating women about the time of ovulation. In the majority of patients with pain and bleeding at the midperiod the symptoms are so mild that no treatment is required. Now and then one sees a patient with symptoms so severe that appendicitis or ectopic pregnancy must be ruled out. Occasionally, surgical intervention is necessary because of a massive hemorrhage. At times one sees a patient who is quite apprehensive because of the midmenstrual bleeding, even though the amount of blood lost is small.

The etiologic aspects of these symptoms are not understood. Those, however, not due to infection will respond to androgenic therapy of 10 mg. a day, administered buccally or sublingually during the cycle for three to four months. A second or even a third course of androgenic therapy may be necessary.

Chronic Cystic Mastitis.—Another common complaint is pain in the breasts, which occurs in cyclic women about one week to ten days prior to the onset of the menstrual period. When the pain is limited to a few days before the period it is called mastalgia or mastodynia. Adenosis or mazoplasia is the name given to this condition when the pain becomes chronic and is present throughout the cycle and when the breasts become nodular.

Both conditions have their origin as a result of disharmony of the pituitary and ovarian mechanism. In both there is a deficiency in progesterone production as indicated by the amount of pregnandiol found in the urine, which is 11.6 mg. per cycle as compared to 39.1 mg. for controls.

Treatment of Mastodynia and Adenosis: In many cases the discomfort produced by both of these conditions is mild and therefore requires no treatment, but should the patient be apprehensive or should the discomfort produced be sufficient to require treatment, the following therapy may be instituted. The estrogens have been found to be of value in some cases on the basis that they inhibit hypophyseal hyperactivity. Mazer has stated that the estrogens proved effective in 61.5 per cent of his cases.

In some cases, however, the condition is aggravated by the estrogens. Since it has been demonstrated that there exists a deficiency of progesterone, it seems to us that progesterone is the medicament of choice—5 to 10 mg. administered parenterally every other day during the last half of the cycle, or the buccal or sublingual route can be used, 25 to 50 mg. per day being given for two consecutive periods. Geschickter, following this schedule, obtained relief which lasted twelve to eighteen months in most of his 27 cases.

Recently the androgens have been used and found to be effective when other methods have failed. Morton has obtained good results with chorionic gonadotropin. He stated that 24 infertile women who had chronic cystic mastitis were relieved of their symptoms and that 8 of them subsequently became pregnant.

Although it seems clear that we do not yet have a miracle drug that will relieve chronic cystic mastitis, we have at least several drugs to choose from. For the cystic type of chronic cystic mastitis, surgical intervention is the only remedy.

Endocrine Treatment of Sterility.—The endocrine factor is said to be wholly or partly responsible for about 25 per cent of involuntary barrenness in married women.

About 4 per cent of our sterile patients have anovulatory cycles. The endocrine method of inducing ovulation is far from satisfactory. Many of our sterile patients showed evidence of an inadequate progestin phase. In other words, we have found a quantitative disproportion between estrin and progestin, resulting in an imperfectly formed pregravid endometrium which may prevent implantation of a fertilized ovum. The treatment here, although it is purely substitutional, is progesterone in 50 mg. doses given by the buccal or sublingual route during the second half of the cycle. When the luteinizing principle of the anterior pituitary is made commercially available, it is hoped that the effect may be lasting.

Menopause.—Estrogenic therapy is the treatment par excellence for the relief of menopausal symptoms. It constitutes the most spectacular form of organotherapy.

About one-third of the women in the menopausal period have symptoms so mild that no treatment is required at all; some have no symptoms. In the majority of those requiring therapy the symptoms are not too severe, but in a small percentage of patients the symptoms are marked. It must be kept in mind that the menopause occurs as the woman approaches her fiftieth birthday. The gall bladder and the myocardium may be undergoing important pathologic changes; all symptoms that these women have should not be ascribed to the menopause. The severity of the symptoms will so often depend on the general condition of the patient, that every effort should be made to improve her general condition. When possible, measures should be instituted prior to the menopause to insure an efficient level of general health.

In using estrogenic hormone for the control of menopausal symptoms, the minimum amount that will control symptoms without inducing bleeding should be used. This ideal is not always possible to attain, as the amount of estrogenic hormone necessary to control symptoms may also cause bleeding. One should not use estrogens when cancer is suspected or when fibroids are present. Should bleeding result even with the use of small doses of estrogenic hormone, it is best to substitute the androgenic hormone.

There are two general types of estrogens, the natural hormonal estrogens that are quite similar and usually identical to the intrinsic estrogens, and the synthetic estrogens whose pharmacologic properties resemble the intrinsic estrogens. We no longer use the synthetic estrogens because of the side effects which occur in many patients. When menopausal symptoms are marked, as much as 5 mg. of estrone sulfate is used per day. As soon as symptoms are relieved, one tablet of estrone sulfate (1.25 mg.) is used per day or every other day. This is continued for a period of two months. If the symptoms are relieved, no further treatment is necessary. Should symptoms recur, a second or even a third course of treatment can be given. There is no longer any necessity for the use of estrogens by hypodermic; the oral method of administration is quite effective.

It must be remembered that the so-called maintenance doses prolong the menopause. I have seen patients who have been taking estrogens for two years or more and still complain of frequent and prolonged bleeding. Novak has ably stated that "it is better to get the pitui-

taryovarian readjustment over with as soon as possible, using estrogen therapy as a temporary makeshift only when the severity of the vasomotor symptoms calls for it."

For patients in whom estrogens produce bleeding, the androgens may be substituted. We may use testosterone linguets in 10 mg. doses daily for a period of two or three months. A second or even a third course may be necessary.

For the patient who does not respond to estrogenic therapy, the vaginal smear technic will help to differentiate between the menopausal syndrome of estrogen deficiency and symptoms due to psychoneurosis.

Endocrinology is far from being an exact science, and the trial and error method must still be employed in the management of many functional problems. Our failures, though they are many, are offset by the gratifying successes.

SUMMARY

The author discusses the development and increasing use of endocrine therapy, its advantages and disadvantages, with a warning against excessive, inappropriate or injudicious administration of hormonal preparations. Functional bleeding, dysmenorrhea, amenorrhea, premenstrual tension, and midmenstrual pain and bleeding are discussed in relation to endocrine therapy, with the authors' recommendations in each instance.

RIASSUNTO

L'A. discute il sviluppo e l'aumento della terapia endocrina, i vantaggi e disavantaggi con avertimento contro l'accessivo amministrazione de preparazione ormoni poco appropriato o senza giudizio.

Porta in discussione flusso sanguigno funzionale, dismenorrea, amenorrea, tensione pre mensile, dolore e flusso mezzo mensile a relazione della terpia endocrina con commendazione in ciascuno caso.

RESUMEN

El autor discute el desarrollo y aumento de la terapéutica endócrina, sus ventajas y desventajas, con una advertencia contra la administración excesiva, inadecuada e imprudente de preparaciones hormonales.

Se discuten hemorragia funcional, dismenorrea, amenorrea, tensión premeñstrual y dolor y hemorragia mesomenstrual en relación con la terapéutica endócrina, con recommendaciones del autor sobre el particular.

RÉSUMÉ

L'auteur discute le développement et l'emploi augmentant de la thérapie endoctrine, ses avantages et ses disavantages. L'emploi excessif inapproprié ou irréflechi des préparation hormonales peut être desastreus.

La dysménorrhee, l'aménorrhée, la tension prémenstruelle et les douleurs et l'hémorragie mid-menstruelle sont discutées en rapport avec la therapie endoctrine; l'auteur donne des recommandations pour chacun de ces états.

ZUSAMMENFASSUNG

Der Verfasser eroertert die Entwicklung, die wachsende Anwendung, die Vorteile und Nachteile der endokrinen Therapie und warnt vor einer uebermaessigen, unangemessenen oder unueberlegten Anwendung von Hormonpraeparaten.

Funktionelle Blutungen, Dysmenorrhoe, Amenorrhoe, praemenstruelle Spannung und Mittelschmerz mit Blutung werden in ihrer Beziehung zur Hormontherapie besprochen, und der Verfasser macht seine Vorschlaege fuer die Behandlung der verschiedenen Zustaende.

SUMÁRIO

O autor discute o desenvolvimento e o crescente uso de produtos endocrinos, suas vantagens e desvantagens, alertando contra a excessiva, impropria ou desordenada administração de preparados hormonais. As hemorragias funcionais da dismenorreia, a amenorreia, a tensão premenstrual, e a dôr, como a hemorragia, durante a mentsruação são discutidas em face da terapêutica endocrina, com as recomendações do autor em cada eventualidade.

Polyethylene Intubation in Reimplantation of the Oviducts

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CHICAGO

THIS is a preliminary presentation of salpingo-uterine intubation with the polyethylene catheter in the treatment of sterility caused by tubal obstruction. The management of this type of sterility can be divided into three stages:

1. Surgical reestablishment of tubal patency.
2. Maintenance of tubal patency during the healing period.
3. Sustenance of tubal patency after healing has occurred.

Evaluation of the various methods used in the first phase will readily show that the corrective or reconstructive procedures (salpingolysis, salpingoanastomosis, salpingostomatomy and reimplantation of the oviducts into the uterus) are based on sound surgical principles and can be executed satisfactorily.

Similarly, in the third phase, after convalescence is completed, the uterotubal insufflation provides an ingenious and effective method for the maintenance of tubal patency, assuming that these passageways have remained open during the important postoperative days of the second phase, during which tissue healing takes place.

The management of this crucial second phase is the Achilles' heel of the treatment of obstructive tubal sterility. This remains so in spite of the free use of various antibiotics (in both preoperative and postoperative stages), which, by eliminating dormant pelvic infections, have to some extent reduced the high percentage of failures accompanying restorative tubal operations.

Insufflation and intubation was tried to minimize the dangers of reocclusion associated with uncontrolled postoperative healing of the reconstructed oviducts.

Holden and Sovak[1] advise uterotubal insufflations, starting them twenty-four to forty-eight hours after implantation of the oviducts into the uterus. Although this is a most useful method of sustaining tubal patency in Phase 3, after healing has occurred, the advisability of its early postoperative employment is debatable. One has to admit that in most laparotomized patients insufflation one to ten days after operation is neither practical nor safe. This is particularly true when tubal implantation has been performed, unless one is willing to expose the patient to the following risks:

1. Forcing potentially infected uterine content of blood and mucus into the new fundal ostia, into the tubes or into the peritoneal cavity.
2. Increasing the possibility of air embolism.
3. Causing emphysema by forcing gases into the still open tissue spaces.
4. Causing disruption, or even perforation of the uterus, in the freshly sutured parts at the site of the implantation.

Some of these complications have been reported in connection with insufflation even without preceding surgical intervention,[2] so one is justified in assuming that they will more readily occur if the insufflationary pressure is employed postoperatively when healing has not yet taken place.

A different approach has been suggested and used by other workers.

Shafeek[3] passes strings of chromic catgut through the lumens of the implanted tubes and leaves them in situ. He relies upon spontaneous absorption or disintegration of the catgut, and uses sterile oil to prevent postoperative adhesions.

Rottger[4] pulls a strand of iodized silk

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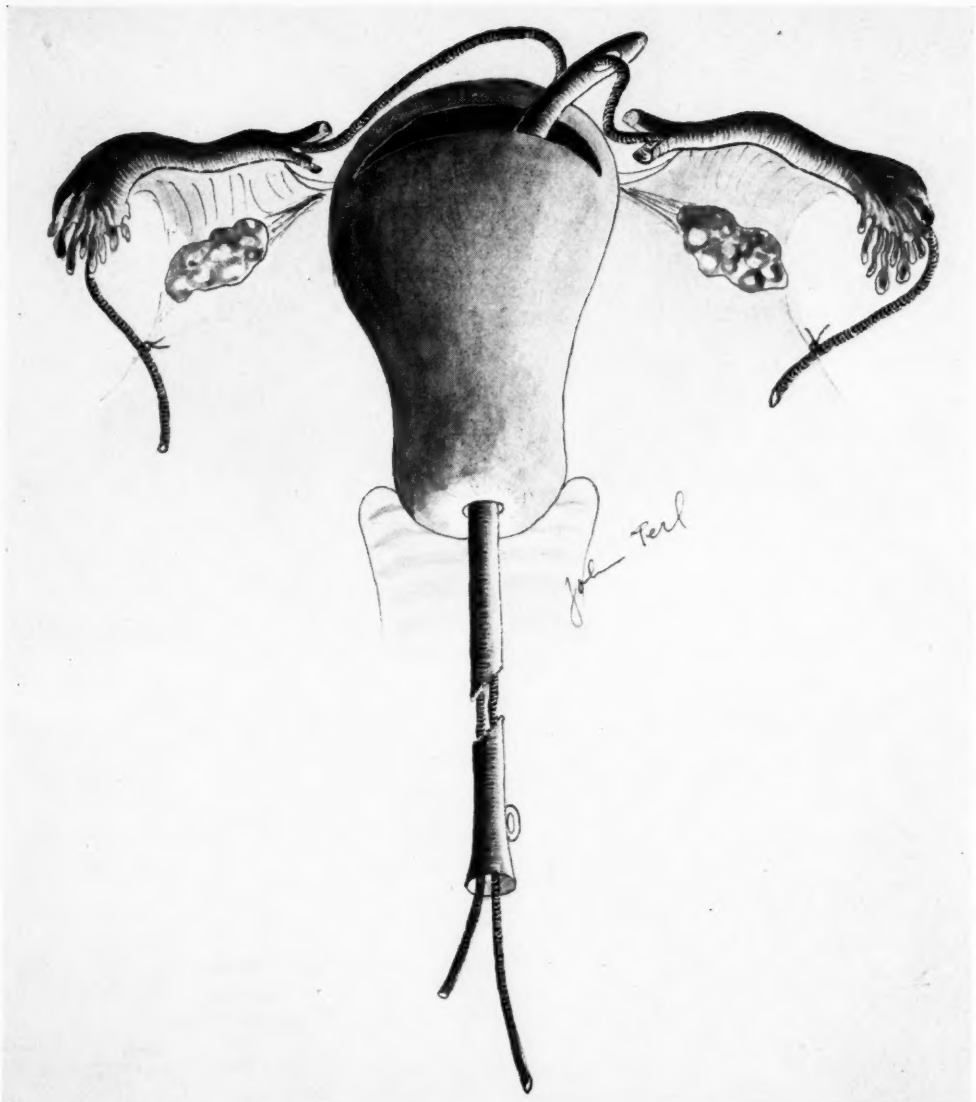

Fig. 1.—Semidiagrammatic illustration shows the metal male catheter, which was introduced into the uterine cavity before the laparotomy, now protruding through a transverse incision across the fundus. Polyethylene tubing is threaded through the salvaged patent parts of the oviducts, which are now prepared for implantation with a 0.75 cm. "fishmouth" incision at their proximal ends. The lateral ends of the polyethylene tubes are transfixed with No. 000 chromic sutures and anchored to the peritoneum overlying the infundibulopelvic ligament, their medial ends being "piped" down via the metal catheter well beyond the vulva. The rest of the operation follows the usual technic for tubal implantation.

through the salvaged patent part of the oviduct to be implanted. He does this with a long metal probe to which the silk is attached; then he maneuvers the instrument through a preformed cylindric opening (identical with Holden-Sovak's reaming operation) of the uterine horn downward into the uterine cavity, the cervical

canal, the vagina and finally out of the introitus. The lower end of the iodized silk is cut loose from the probe and deposited into the posterior vaginal vault, while the abdominal end is left extending 5 to 8 cm. beyond the fimbriated portion of the implanted tube. The silk is removed in eight to ten days unless the tubo-uterine peristalsis spontaneously expels it sooner.

Westman[5] recommends the insertion of nonirritating cholesteroloxalate plugs into the newly formed abdominal ostia of the Fallopian tubes. The proper position of the plug is assured with one or two fine catgut sutures. He leaves these cholesteroloxalate inserts in situ for one month and removes them by vaccine-induced artificial fever, raising the patient's rectal temperature to 40.5 C., at which point the plug material melts. After the melting procedure, in order to remove all residual cholesteroloxalate, daily uterotubal irrigations are made with 40 cc. of saline-penicillin solution for three to five days. The procedure is limited to salpingostomotomy and similar operations on the distal portions of the oviducts.

Gepfert[6] secures a piece of allantoin membrane into the outer half of the fallopian tubes to prevent their reocclusion during the healing period. This method is also limited to operations performed on the distal part of the oviducts.

D'Ingianni[7] emphasizes the importance of larger caliber intubation than catgut or silk would provide at the site of the tubal implantation. To protect the new tubo-uterine ostium from compressions and obstruction, he inserts a flexible stainless steel cannula into the tubal end to be implanted. The cannula is provided with a bracing wire, which is carefully threaded through the uterine cavity and cervical canal into the vagina. The vaginal end of the wire is clipped off, enough being left to be curved over the portio vaginalis into the lateral fornix. He leaves the instrument in situ for three to four months, after which it is extracted with the help of the wire in the vaginal fornix.

Milnor, Bowles and McCorriston[8] intubate the reconstructed or reimplanted oviducts with a ureteral catheter introduced through the fimbriated end and passed into the uterus. The free end of the catheter is brought out through the abdominal incision, from which area it is removed within five days.

In review of the foregoing methods one may conclude that in the first two weeks of the postoperative period insufflation is neither a practical nor a safe procedure. To keep the tubal lumens open with chromic catgut or iodized silk is objectionable because of the small diameter, sheering surface and chemical impregnation of the intubating material, which all tend to damage the delicate ciliated epithelium of the tubal mucosa. The cholesteroloxalate plug is a nonirritating material, but it can be employed only in salpingostomies, and its removal with uterotubal irrigations subsequent to its melting with artificial fever seems to be too involved an operation. The allantoin membrane method of Gepfert is a very attractive procedure because the material is ideally harmless for intubation. Although its use has been restricted to operations on the distal half of the oviduct, there is no reason why it could not be employed in reimplantation of the tubes into the uterus.

The use of D'Ingianni's steel cannula is a technically complicated operation and is likely to cause pressure-induced fibrous changes at the site of application.

The method employed by Milnor, Bowles and McCorriston lacks one important factor, namely, the stabilization of the intubating catheter within the uterine cavity. The free intra-abdominal segment of the catheter between the fimbriated ostium of the tube and the abdominal incision is fully exposed to the pressure and the drag of loops of intestine, which could easily dislodge the catheter.

To avoid some of the undesirable features and shortcomings of the methods enumerated, I recommend the use of a 1.5 mm. polyethylene tube for temporary catheterization of the reconstructed tubo-uterine passageways. This material is smooth, flexible, elastic, strong and, from the physiochemical point of view, inert.

Fig. 2.—Semidiagrammatic illustration shows technic of salpingouterine catheterization when employed in the Holden-Sovak type of tubal implantation. As in the previous illustration, the polyethylene tubing is threaded through the salvaged patent parts of the oviducts which are prepared for implantations. To receive the plastic tubing in this "reaming" operation the tip of the metal catheter is pushed out first through one of the preformed cylindric openings on the uterine horns. After the "piping-down" process is completed, the metal catheter is slightly withdrawn into the uterine cavity and its tip maneuvered through the reamed hole of the opposite side to receive the second polyethylene tube. After both plastic tubes are 8 to 10 inches (to cm.) outside the introitus, the metal catheter is carefully removed, the plastic inserts being left in situ. The chromic sutures which anchor the plastic catheters to the peritoneum over the infundibulopelvic ligament may be placed after removal of the metal catheter. If so, the intra-abdominal ends of the plastic tubings should be temporarily secured with hemostats to prevent their slipping away. The rest of the operation follows the technic of implantation applicable to the reaming operation.

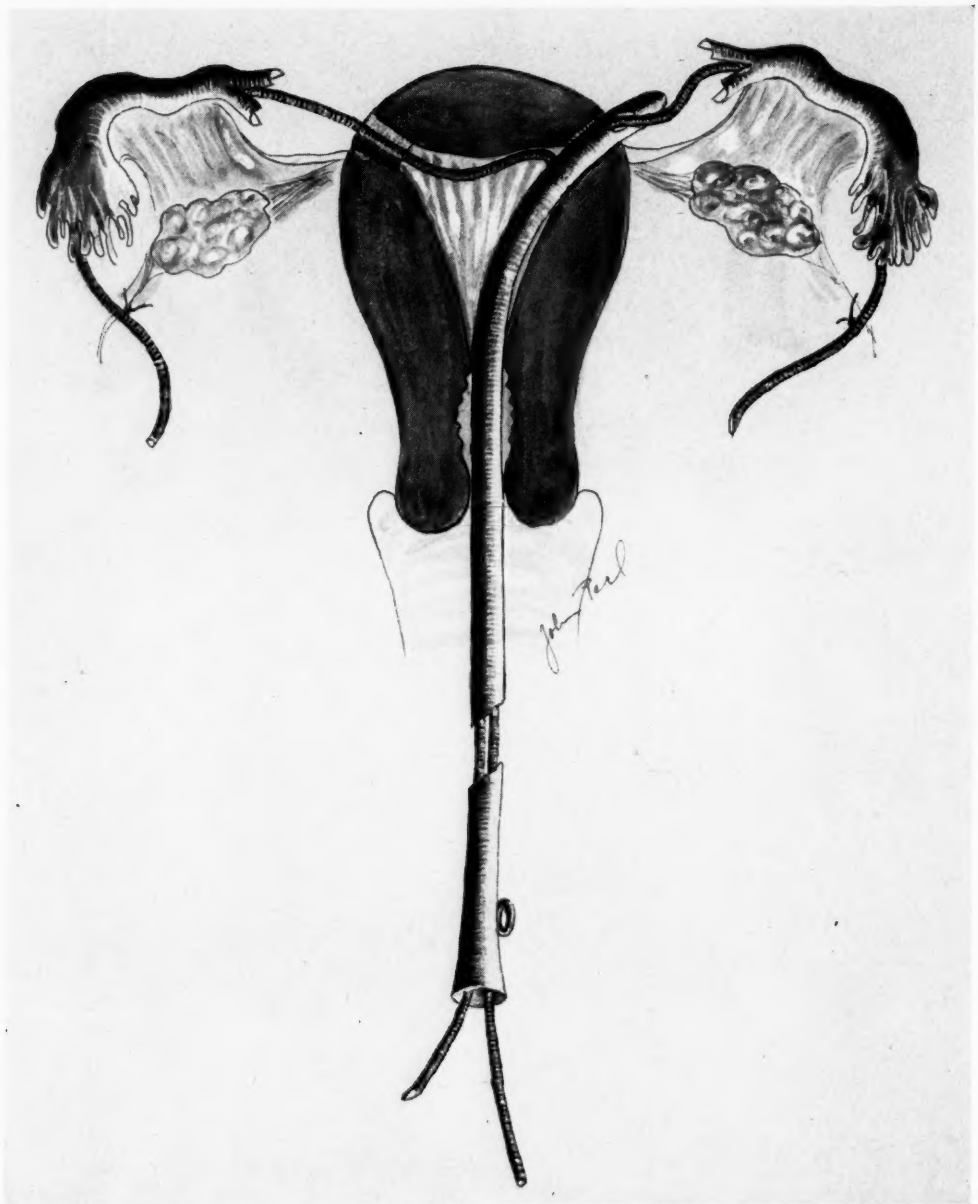

Fig. 3.—Illustration showing essentially the same procedure as in Figure 2, with the uterine cavity exposed by longitudinal section. One polyethylene tube has been "piped" down through the metal catheter; the tip of the latter now emerges through the opposite cornu's cylindric opening to receive the second plastic tube. The implanting sutures are omitted for the sake of clarity.

It can be threaded without difficulty into and through the tubal lumens and, because of its smooth, pliable elasticity, it conforms without any pressure to the configurations of the latter.

The procedure of tubo-uterine cathe-

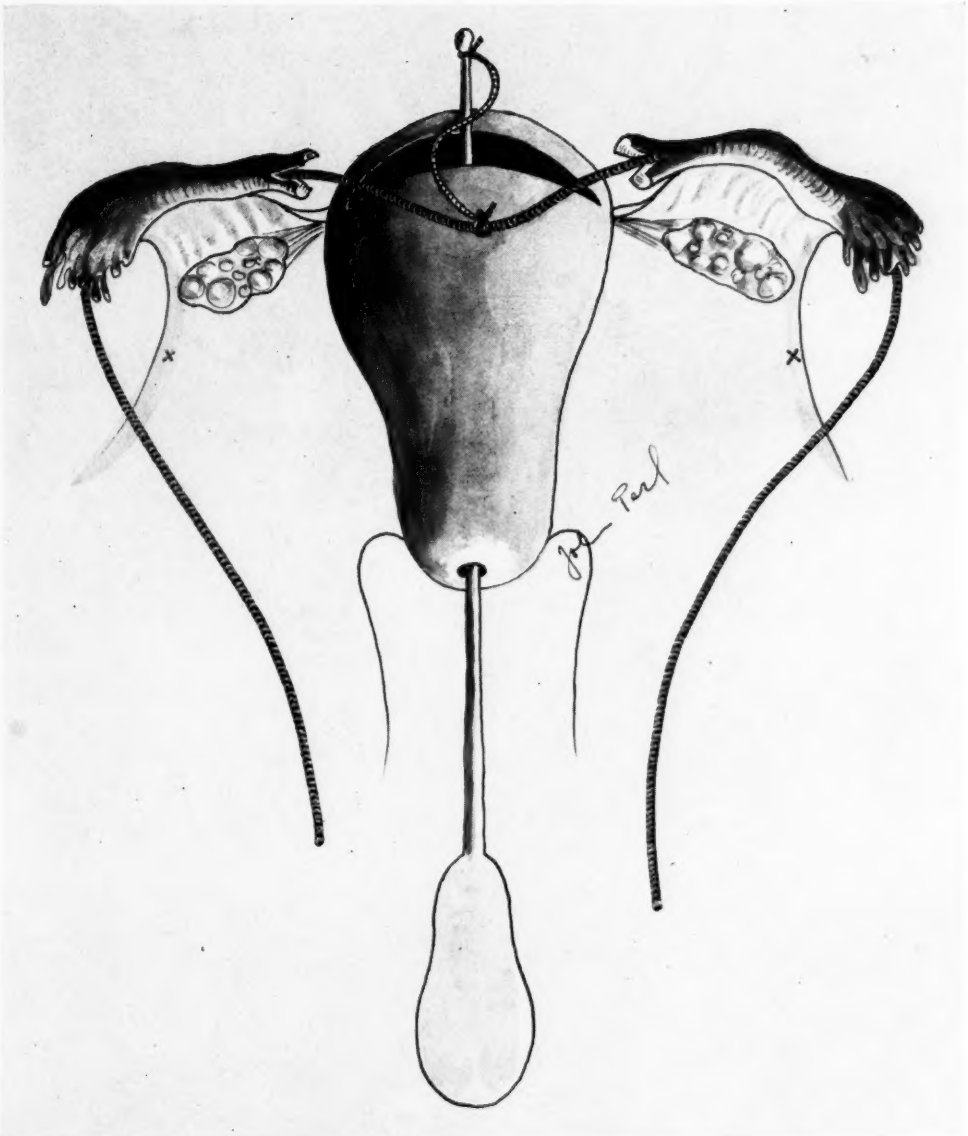

Fig. 4.—When transverse fundal incision is employed in tubal implantation, instead of the metal catheter, a uterine probe can be used for transportation of the plastic tubing to outside the introitus. This illustration shows the oviducts suspended upon the polyethylene tubing and prepared in the usual manner for implantation. The fundal cavity is exposed by a transverse incision; the tip of the uterine probe is moved into view, and heavy braided silk is tied below its knob. The other end of the silk is tied over the free midsection of the polyethylene catheter between the fallopian tubes, after which the probe is withdrawn, pulling silk and plastic tubing outside the vulva. Routine implantation of the oviducts will follow, with closure of the fundal incision. The abdominal ends of the plastic catheter will be anchored to the peritoneum of the infundibulopelvic ligament at the points marked X.

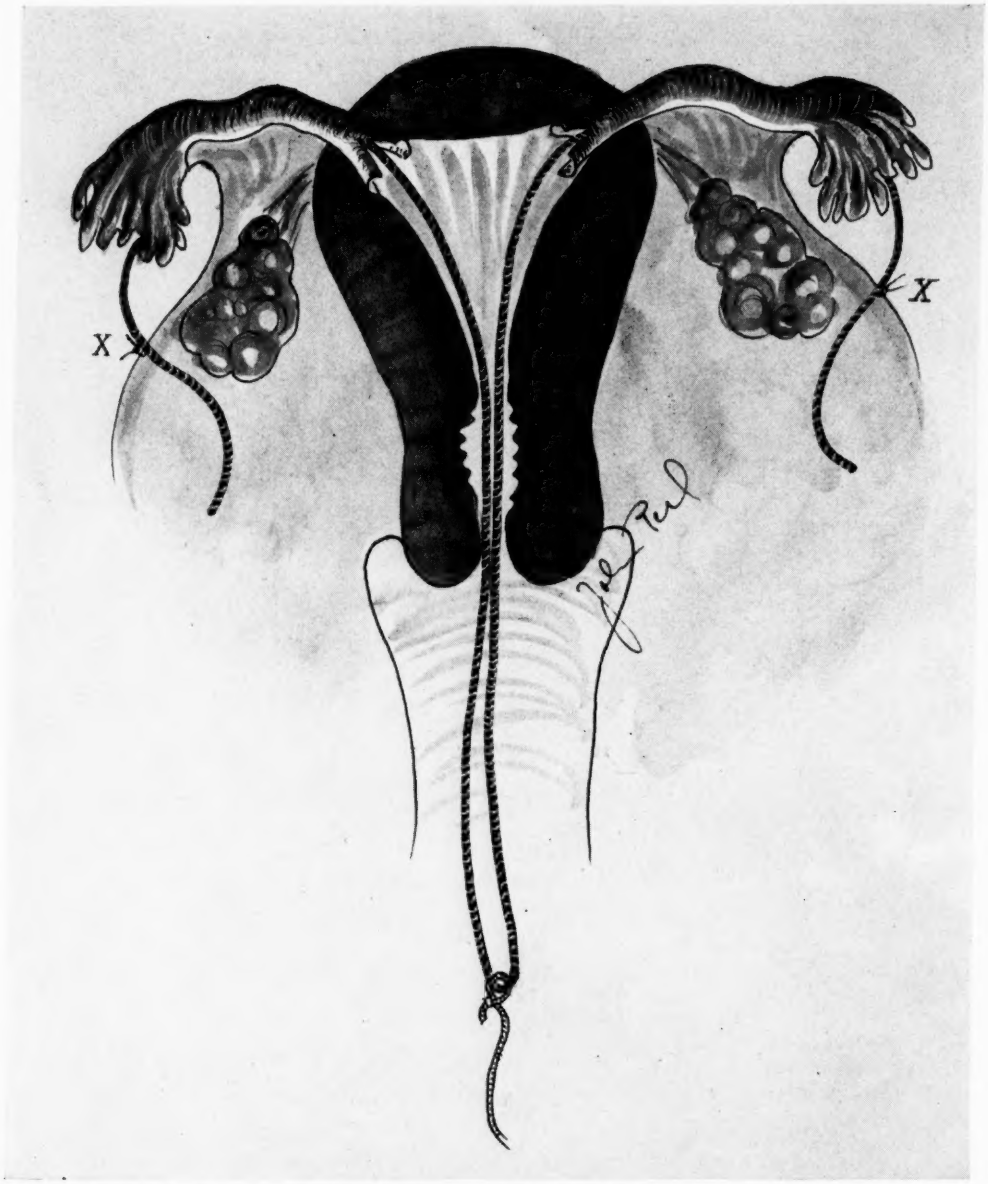

Fig. 5.—Longitudinal section of the uterus, showing both oviducts implanted into the cornua, with an intubating catheter in the entire length of the genital canal. The abdominal ends of the plastic tubing are anchored at *X* to the peritoneum; the rest has been pulled to outside of the vulva, where it is securely taped to the prevulvar skin.

terization is simple, and it is readily adaptable to all forms of tubal implantation. The essential points are as follows:

1. Both ends of the intubating plastic catheter are anchored in such a manner that tubo-uterine peristalsis cannot dislodge it. This is accomplished with a transfixing suture of the abdominal end

of the catheter to the pelvic peritoneum, just below the fimbriated ostium of the oviduct, and by securing the external end of the catheter to the prevulvar skin.

2. A metal male catheter or a uterine probe is used for transportation of the polyethylene tube via uterus and vagina to the outside of the introitus. Before laparotomy, one of these instruments is introduced into the uterine cavity, and the prevulvar portion of its shaft is fastened to the skin with adhesive tape. When ready for laparotomy, the patient's legs should be sufficiently in abduction to facilitate the manipulation of these carrier instruments during the operation.

Otherwise, the technic is best explained by the illustrations.

After the operation is completed, the polyethylene tubes, as they emerge from the introitus, are rearranged and secured in such a position as not to interfere with walking or with the routine daily care of the anovulval region.

The intubating catheters are left in situ for twelve to fourteen days (that is, for the period of tissue healing) or longer if desired. For removal, a slight tug upon the prevulvar part of the tubing is sufficient to break the anchoring pelvic sutures and permit painless extraction. The follow-up treatment, in the form of uterotubal insufflation, may be started when all pelvic tenderness and vaginal discharge have ceased.

SUMMARY

1. The importance of controlled healing after reconstructive operations on the fallopian tubes is emphasized.

2. For splinting the site of tubal implantation, a technic of *anchored* polyethylene intubation of the salpingouterine passageways is presented.

RESUMEN

1. Se señala la importancia de la curación verificada después de operaciones reconstructivas de las trompas uterinas.

2. Se presenta una técnica para fijar con polietileno la entubación de las vías salpingouterinas.

ZUSAMMENFASSUNG

1. Es wird die Wichtigkeit einer kontrollierten Heilung nach Wiederherstellungsoperationen an den Eileitern hervorgehoben.

2. Es wird eine Technik der Intubation der Durchgaenge vom Uterus in die Eileiter mittels eines verankerten Polyethylenrohres beschrieben. Das Verfahren soll zur Schienung der Gegend der Tubeneinpflanzung dienen.

RÉSUMÉ

1. On insiste sur l'importance de la cicatrisation après les opérations sur les trompes de Fallope.

2. On présente une technique qui consiste à placer un tube de polyéthylène pour tuneliser la voie salpingo-utérine qui a été incisée.

RIASSUNTO

1. L'importanza di guarigione controllata dopo operazioni ricostrutive sulla tromba di Fallope e' accentuata.

2. Presenta una tecnica di intubazione ancorata di polyethylene del vestibolo salpingo—uterino, come bendaggio al sito del impiantamento tubale.

SUMÁRIO

1) A importancia de cicatrização controlada depois de operações reconstrutivas sobre as trompas de Fallópio é realçada.

2) Para encanar o sitio da implantação túbaria, uma técnica de intubação dos condutos salpingo-uterinos por polyethyleno ancorado é descrita.

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Echoes of the Past

IX. THE ORIGIN OF MEDICAL LICENSURE

There were no rules or regulations to guide the physician up to the year 200 A. D. It is true however that a voluntary code of ethics was accepted in some instances by physicians. The ethical code was based upon the oath of Hippocrates. In the year 200, Septimus Severus finally introduced a system of licensure. Twenty-five years later Alexander Severus honored the physicians by accepting them in the same category as imperial physicians.

Under the decree of licensure certain acts were punishable. For example, the administration of an abortifacient or criminal neglect of a patient was punished by a heavy fine. The license of a convicted abortionist could be revoked.

Other regulations governed the physician's conduct. Many restraints were voluntary or were based upon advice given to the doctors by their teachers. Galen instructed his students concerning the behavior of the physician toward his patient, emphasizing the need of courtesy and solicitous interest.

Prior to undertaking the study of medicine, a student was required to submit a certificate of good moral character. This may be compared in some way to the student's qualifying certificate demanded by some states prior to matriculation in a medical school.

It was in 370 A.D. that an imperial edict ordered the acquisition of a pre-medical certificate. Before entering upon his studies, each student had to present a certificate from his local police officer, testifying to the candidate's good conduct and containing his current address. Additional restrictions were placed upon the student after matriculation. The young men were forbidden to join illegal societies or to enter brothels and were warned against keeping any house revelries going too long. Repetition of the offense brought dismissal.

The foregoing restrictions on medicine in ancient Rome became the basis for the many regulations imposed upon medicine in our own age. A great difference, however, existed in the benefits derived by the people from the medical profession; medical knowledge at that time was available only to the wealthy. No one was concerned with the poor, and no official authority demanded that assistance be given them. The physician himself never considered treating them free of charge.

—Bernard J. Ficarra, M.D., F.I.C.S.

Personal Evaluation of Vagotomy in the Treatment of Peptic Ulcer

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IN attempting to evaluate any new surgical procedure one is dependent upon the contemporary literature. The permanence and scope as well as the limitations of the operation can best be established by personal experience.

Since 1946, vagotomy alone or vagotomy combined with some other procedure has been performed by me in 89 instances for the treatment of peptic ulcer. In 56 of these the follow-up has been of sufficient duration and detail to establish the following facts: (*1*) that the overall results of this series were not especially good, and (*2*) that the poor results were caused either by incomplete operation, by poor selection of the patient for the procedure used, or by violation of a surgical principle having no bearing upon division of the vagus nerve.

This presentation will include a statistical report of results obtained with vagotomy, a review of case histories of patients with peptic ulcer in whom unsatisfactory sequelae followed division of the vagus nerves, and an attempt to establish, from these observations, criteria for the selection of ulcer patients most likely to be benefited by vagotomy.

Clinical Data.—From June 1946 to August 1949, 56 patients have been subjected to vagotomy for the treatment of peptic ulcer on my private surgical service at Presbyterian Hospital, Denver. These patients have been followed for thirteen to fifty months both by personal visits and by questionnaires.

The general indications for operation were (*1*) marginal ulcers and (*2*) duodenal ulcers. All patients with duodenal ulcers were referred by competent internists who considered the ulcers refractory to conservative treatment. Patients having a history of duodenal ulcer with hemorrhage were considered unsuitable candidates for vagotomy.

Vagotomy was performed for duodenal ulcer in 48 patients, for marginal ulcer in 5 and for gastric ulcer in 3 (Table 1). Unknown to me at the time of operation, 1 patient with a duodenal ulcer had had significant bleeding. Three of the 5 patients with marginal ulcers had noted moderate to severe bleeding from the upper part of the gastrointestinal tract.

The series consisted of 44 men and 12 women, whose ages ranged from 22 to 81 years. The average age was 44.2 years.

Results.—The results obtained by vagus section in this series are recorded in Tables 1 and 2. Six of the patients on whom transthoracic vagotomy was performed are considered to show satisfactory results. For 3, or 33.3 per cent, the operation is considered to have been a failure. Forty-two patients obtained satisfactory results from transabdominal vagotomy, and in 6 of these the operation was confined to division of the vagus nerves without additional gastric procedures. One patient in this group in whom the operation failed, also underwent vagotomy only. Four of 32 patients undergoing vagotomy combined with posterior gastroenterostomy obtained results considered to be unsatisfactory. All of the 8 patients subjected to vagotomy combined with subtotal gastric resection obtained satisfactory results.

Five patients with marginal ulcers obtained satisfactory results after section of the vagus nerves. Eleven complications and 1 death occurred during hospitalization in this series (Table 3).

Read at the Fifteenth Annual Assembly of the United States Chapter, International College of Surgeons, Cleveland, Oct. 31, 1950.
Submitted for publication Nov. 27, 1950.

TABLE 1.—*Type of Ulcer and Operative Procedure*

Operation	Duodenal Ulcer		Jejunal Ulcer		Gastric Ulcer		Tota	
	Cases	Failures	Cases	Failures	Cases	Failures	Cases	Failures
Transthoracic vagotomy	6	2	2	0	1	1	9	3
Subdiaphragmatic vagotomy only	6	1	1	0	0	0	7	1
Vagatomy and gastroenterostomy	32	4	0	0	0	0	32	4
Vagatomy and gastric resection	4	0	2	0	2	0	8	0
Totals	48	7	5	0	3	1	56	8

TABLE 2.—*Results of Section of Vagus Nerves*

Operation	Cases	Good Results	Failures	% of Failures
Transthoracic vagotomy	9	6	3	33.33
Subdiaphragmatic vagotomy only	7	6	1	14.28
Vagotomy and posterior gastroenterostomy	32	28	4	12.5
Total	56	48	8	14.3

Several patients had some undesirable side effects, such as gastric retention, mild to moderate diarrhea, intercostal neuralgia and eructation of foul gas. Except as noted in the case histories, these were either temporary or so mild that they were not considered significant when the patients completed the follow-up questionnaires. Unsatisfactory results were noted in 14.3 per cent of the cases in this series.

Analysis of Failures.—Brief case histories illustrating failures are presented in the following paragraphs.

CASE 1.—A 36-year-old man with typical ulcer pain of fifteen years' duration was referred for surgical treatment on July 5, 1946. His symptoms were intractable to a well regulated medical regimen.

Roentgenograms of the upper part of the gastrointestinal tract demonstrated a stomach which emptied rapidly and a large duodenal ulcer deformity. The level of gastric acidity and that of night secretion of gastric juice were elevated.

TABLE 3.—*Postoperative Complications*

Complication	No. of Cases
Atelectasis	3
Pleural effusion	2
Thrombophlebitis	2
Bronchopneumonia	1
Pulmonary embolism	1
Acute gangrenous cholecystitis	1
Pulmonary edema (cardiac failure)	1
Total	11

A transthoracic vagotomy was carried out on July 10, 1946. The patient's convalescence was marked by moderate atelectasis of the lung on the surgically treated side. He was discharged from the hospital on the tenth postoperative day. His original symptoms returned three months after operation and were again refractory to medical treatment. Gastric analysis after administration of insulin indicated incomplete division of the vagus nerves. The patient remained asymptomatic after a subtotal gastric resection performed elsewhere in March 1949.

Comment: This failure was obviously due to incomplete resection of the vagus nerves at the time of the patient's original operation.

CASE 2.—A 46-year-old man was admitted to the hospital on Oct. 12, 1946, complaining of epigastric distress, anorexia and weight loss. Gastric analysis and quantitative night secretions were n o r m a l. Gastrointestinal roentgenograms revealed the presence of a penetrating ulcer high on the lesser curvature of the stomach. The lesion was easily visualized with a gastroscope and had the appearance of a benign gastric ulcer.

Transthoracic division of the vagus nerves was accomplished on October 22. The patient's convalescence was uncomplicated, and he was dismissed from the hospital on the eighth postoperative day. The symptoms had been completely alleviated; the appetite returned to normal, and the patient began to gain weight. Three weeks after operation the gastroscopist reported that the gastric ulcer

had diminished, and gastroscopic examination during the sixth postoperative week revealed only a scar at the old ulcer site. Gastrointestinal roentgenograms revealed no abnormality. In March 1947 the patient had a recurrence of his original gastric distress. Gastric analysis revealed achlorhydria, the status of which was unchanged after the injection of histamine and insulin. The gastroscopist stated that the diameter of the recurrent ulcer was greater than when visualized before the operation. On examination the crater appeared to be shallow and the edges of the ulcer elevated. Neoplastic transformation was suspected, and the patient was urged to have his abdomen explored. At abdominal exploration on April 8 the gallbladder was seen to be distended, but it emptied upon the application of slight pressure, and it apparently contained no stones. The head of the pancreas was markedly enlarged and had the consistency of a ball of yarn. The stomach and the walls of the small intestine appeared to be thickened, but they felt very light when held and manipulated with the palpating hand. There was a large ulcer high on the lesser curvature. Subtotal gastric resection was carried out without technical difficulty. The resected stomach was opened by the pathologist, and, in addition to a large benign ulcer on the lesser curvature, many small, shallow ulcers and erosions were found over the mucosa of the distal half of the stomach. The patient's convalescence from this procedure was uncomplicated. He has remained asymptomatic, and has maintained an excellent state of nutrition for four years.

Comment: The recurrence of a gastric ulcer four months after complete interruption of the vagus nerves places the status of this operation for the treatment of gastric ulcer in a questionable category.

CASE 3.—A 39-year-old laborer had been entirely free from ulcer pain for one and one-half years after a transthoracic vagotomy. He had been disabled periodically for ten years prior to this procedure. One month before his second admission, postprandial epigastric fullness and nausea developed, and the patient regurgitated foul liquid material and poorly digested particles of food. Gastric analysis failed to reveal the presence of free hydrochloric acid. Gastrointestinal roentgenograms showed complete retention of a barium meal twenty-four hours after its ingestion. The stomach was atonic and markedly dilated.

The patient reluctantly submitted to a posterior gastroenterostomy on Feb. 18, 1948. His postoperative course was complicated by gastric dilatation and marked retention of gastric secretions. Doryl and urecholine were helpful. A thirty-day period of hospitalization was necessary. The patient is now free from ulcer pain. His appetite is poor, and he complains of eructating foul gas and of frequent regurgitation of food. The notes appended to this patient's questionnaire imply complete dissatisfaction with the "second operation" for ulcer. Requests for further gastrointestinal studies have been refused.

Comment: Experience with this case indicates that a delayed drainage operation is ineffective because permanent changes in the tone of the gastrointestinal tract have transpired.

CASE 4.—A 54-year-old obese housewife was admitted to the hospital on Feb. 7, 1947, with a history of ulcer pain for twenty-four years. An acute perforation occurred in 1941, and the pain had finally become unbearable. Roentgenograms of the gastrointestinal tract showed a duodenal ulcer with marked deformity of the duodenal cap. The stomach emptied rapidly. At operation one month later a penetrating duodenal ulcer was demonstrated, although the diameter of the duodenum appeared to be adequate. An omental patch was sutured over the ulcer, and a subdiaphragmatic vagotomy was accomplished. Four months after this operation the patient was attacked by nausea, vomiting, abdominal pain and fever. The gastric acid level was high, and there was a maximum response to the insulin test. Roentgenograms of the upper part of the gastrointestinal tract demonstrated a persistent duodenal ulcer defect. Four days after hospitalization, deep jaundice developed; the liver was palpable, and laboratory data compatible with homologous serum jaundice were obtained. The jaundice was thought to be due to plasma given at the time of operation four months earlier. Convalescence from this illness was stormy. The patient has remained free from ulcer pain and has normal digestion.

Comment: This case is listed as a failure because it is obvious that complete vagotomy was not accomplished and the patient has a persistent duodenal ulcer. It does, however, illustrate the fact that some patients with incomplete vagus section get complete relief of their ulcer pain.

CASE 5.—A 50-year-old farmer was subjected to subdiaphragmatic vagus section and posterior gastroenterostomy on June 6, 1947. This operation followed twenty years of only partially successful medical treatment for duodenal ulcer.

At the end of one year the patient reported by letter that he felt better than at any time during the past twenty years. In answering a questionnaire mailed in the early spring of 1950, the patient's wife reported that he had expired suddenly from a massive hemorrhage of the upper part of the gastrointestinal tract. Subsequent correspondence revealed that the patient had bled prior to his operation in 1947. This important item in the patient's history had not been obtained previously.

Comment: This unfortunate experience demonstrates and reemphasizes the importance of removal of the ulcer in patients past middle age who have a history of bleeding. It is felt that any operation accomplishing less than this is inadequate.

CASE 6.—An 81-year-old man was referred for surgical exploration because of a prepyloric defect demonstrated on two roentgen examinations of the gastrointestinal tract. He had lost 30 pounds (13.6 Kg.) and had some midepigastric distress. Gastric analysis revealed hyperacidity. Abdominal exploration one week after admission revealed a peculiar congenital defect in the duodenum. Distal to the pyloric ring the duodenum turned sharply in a posterior direction. Its second portion was bound down by a congenital band. An active ulcer was visualized just proximal to this anomaly. The reason for the diagnostic mistake seemed obvious. Because there was some obstruction and the patient had a high gastric acid level, a posterior gastroenterostomy and subdiaphragmatic vagotomy was deemed the operation of choice.

On the tenth postoperative day the patient experienced excruciating pain in the upper part of the abdomen, fever and leukocytosis. He was extremely tender in the right upper quadrant, and a mass which felt like a distended gallbladder could be palpated. Exploration revealed acute gangrenous cholecystitis. Because of the patient's poor condition drainage was instituted and the abdomen closed. The patient left the hospital in good condition fourteen days after this procedure, and the drain was removed from the fundus of the gallbladder on the twenty-first postoperative day. He felt well for three months and then died suddenly from bile peritonitis secondary to a silent perforation of the gallbladder.

Comment: The error in this case was in performing the original operation. A well controlled medical regimen would undoubtedly have given this patient sufficient relief to carry him through the remaining years. The altered physiologic process that produces a gangrenous change in the gallbladder causes us to question the advisability of vagus resection in older persons.

CASE 7.—A 60-year-old man with a long-standing history of gastric distress was admitted to the hospital on Feb. 12, 1947. A persistent duodenal defect was demonstrable on the roentgenograms that the patient brought with him. Gastric analysis and night secretion studies were not obtained.

On February 13 the patient was subjected to subdiaphragmatic section of the vagus nerves and a posterior gastroenterostomy. The duodenum was not visualized because of adhesions. The postoperative course was complicated by atelectasis and marked gastric retention. Continuous suction was necessary for twelve days after operation.

The patient was dismissed from the hospital on the twenty-fourth postoperative day. However, vomiting persisted; the patient lost weight and complained of extreme weakness after meals. We were informed by another surgeon, who disconnected the gastroenterostomy and repaired a large postoperative ventral hernia six months later, that he showed no evidence of having had a duodenal ulcer at any time.

Comment: This failure can be attributed to insufficient study of the case before, during, and after operation. A neurotic patient seeking help had a "dumping syndrome" and a large postoperative ventral hernia added to an already severely overtaxed nervous system.

CASE 8.—A 56-year-old teacher who had thyroid heart disease and a long-standing history of duodenal ulcer was admitted to the hospital in July 1949. In the month preceding admission she had lost 20 pounds (9.1 Kg.), and stated that she found it difficult to retain fluid or food. The patient had a nodular goiter, and the referring physician stated that she had had auricular fibrillation almost constantly for two years. There was complete

retention of a barium meal. After considerable consultation the patient was subjected to a posterior gastroenterostomy and subdiaphragmatic section of both vagus nerves. She was given 1,000 cc. of blood and 1,000 cc. of dextrose and saline solution during and immediately after the operation. However, she died twelve hours after operation of pulmonary edema.

Comment: This failure was considered due to excessive parenteral fluid administration.

SUMMARY

This paper consists of an evaluation of the author's personal experience with vagotomy in the treatment of peptic ulcer. Included are statistical reports of results obtained with vagotomy and brief case histories of patients who obtained unsatisfactory results. As a result of this experience the author considers vagotomy definitely beneficial and indicated for properly selected patients with duodenal ulcer. In his opinion, however, vagotomy is contra-indicated for (*1*) older patients, especially those past middle age; (*2*) patients with a history of hemorrhage, and (*3*) patients with gastric ulcer. Vagotomy has its greatest efficacy in patients with duodenal ulcers without a history of hemorrhage, for whom sufficient, properly supervised treatment has failed. These patients should be carefully studied and evaluated prior to operation. With the foregoing experiences and opinions in mind, it is believed that vagotomy has a definite place in the armamentarium of the surgeon today.

RÉSUMÉ

Cet article relate les expériences de l'auteur dans le traitement de l'ulcère peptique par la vagotomie. L'auteur inclut aussi ses statistiques, un bref résumé historique de chaque cas heureux et malheureux. Comme conclusions, l'auteur affirme que la vagotomie est indiquée dans certains cas d'ulcères du duodénum, cas cependant qui doivent être bien choisis. Il opine que la vagotomie est formellement contre-indiquée, lo chez des patients d'âge moyen; 20 qui ont fait une hémorragie; 30 ceux qui souffrent d'ulcèregastrique. La vagotomie est très efficace comme traitement chez ceux qui n'ont pas d'hémorragie et qui après un traitement suffisant et suivi n'ont pas eu de résultat satisfaisant. Chaque cas doit être étudié avec prudence et un estimé de leur état fait. Se basant sur ses expériences et sur ses faits cliniques, l'auteur prétend que la vagotomie a une place très définie dans l'arsenal thérapeutique du chirurgien contemporain.

RESUMEN

Se consigna una evaluación de la experiencia personal del autor con la vagotomía en el tratamiento de la úlcera péptica. Se incluyen informes estadísticos de los resultados obtenidos con la vagotomía, así como breves historias clínicas de pacientes en quienes el resultado no fué satisfactorio. El autor considera, como resultado de esta experiencia, que la vagotomía es definitivamente beneficiosa y está indicada en casos adecuadamente seleccionados de úlcera duodenal. Sin embargo, la estima contraindicada en: (1) pacientes que han pasado la edad media, (2) pacientes con antecedentes de hemorragia y (3) pacientes con úlcera gástrica. Considera que la vagotomía da mejores resultados en pacientes ulcerosos duodenales sin antecedentes hemorrágicos, en quienes haya fracasado un tratamiento suficientemente y adecuadamente vigilado. Estos pacientes deben ser cuidadosamente estudiados y evaluado su estado antes de la operación. El autor sostiene que, en atención a las experiencias y observaciones antedichas, la vagotomía tiene un lugar definitivo en el arsenal del cirujano moderno.

ZUSAMMENFASSUNG

Die Arbeit enthaelt eine Auswertung der persoenlichen Erfahrungen des Verfassers mit der Vagotomie in der Behandlung des peptischen Geschwuers. Einge-

schlossen sind Statistiken von mit Vagotomie erzielten Ergebnissen und kurze Krankheitsgeschichten von Patienten, bei denen die Resultate unbefriedigend waren. Auf Grund seiner Erfahrung betrachtet der Verfasser die Vagotomie als durchaus wertvoll und angezeigt in sorgfaeltig ausgewaehlten Faellen von Zwoelffingerdarmgeschwueren. Er haelt jedoch die Vagotomie fuer kontraindiziert (1) bei Kranken jenseits des mittleren Lebensalters, (2) bei Kranken mit einer Anamnese von Blutungen und (3) bei Kranken mit Magengeschwueren. Am wirksamsten ist die Vagotomie bei Kranken mit Zwoelffingerdarmgeschwuer ohne Blutungen, bei denen eine ausreichende und sorgfaeltig ueberwachte medizinische Behandlung versagt hat. Diese Kranken sollten vor der Operation genau beobachtet und einer Auswertung ihres Zustandes unterzogen werden. Unter Beruecksichtigung aller dieser Erfahrungen und Beobachtungen kommt der Verfasser zu dem Schlusse, dass die Vagotomie ihren wohleingeordneten Platz im Ruestzeug des modernen Chirurgen innehat.

RIASSUNTO

Questi documenti parlano d'una valutazione dell'esperienza personale del'A. con vagotomia nel trattamento di ulcera peptica. Compresovi relazioni statistiche dei risultati ottenuti con vagotomia e breve storie di pazienti nei quali i risultati furono poco soddisfacente. Come risulto di quest'esperienza l'A. considera vagotomia definitivamente vantaggioso ed indicata nei casi propriamente scelti di ulcera duodenale. Nel sua opinione, tuttavia, vagotomia e' contra-indicata per (1) pazienti passato media eta', (2) pazienti colla storia di emorragia e (3) pazienti con ulcera gastrica. Vagotomia e' il piu efficace per pazienti con ulcera duodenale senza emorragia, pei quali trattamento bastante e sorveglianza propria ha fallito. Questi pazienti dovrebbero essere studiati attentamente e loro stato valutato in anticipo dell'operazione. Con le precedenti esperienze ed osservazioni in mento, l'a. sostene che vagotomia ha luogo definito nel armamentarium del chirurgo moderno.

SUMÁRIO

Este artigo contem um resumo da experiencia pessoal do autor com a vagotomia no tratamento da ulcera peptica Foram incluidos dados estatisticos obtidos com vagotomias como tambem histórias abreviadas de pacientes nos quais os resultados não foram satisfatorios. Baseado em sua experiencia o autor considéra a vagotomia de indubitavel utilidade e acredita que ela seja indicada nos casos de ulcera duodenal devidamente selecionados. Em sua opinião, contudo, a vagotomia está contraindicada em (1) pacientes alem de meia idade, (2) pacientes com caso de hemorragia e (3) pacientes com ulcera gastrica.

A vagotomia é mais eficaz em enfermos portadôres de ulcera duodenal sem casos de hemorragia, nos quais o tratamento clínico propriamente conduzido fracassou. Estes pacientes devem ser cuidadosamente estudados e suas condicões avaliadas antes da operação. Devido as precedentes experiencias e observações pessoais citadas a autor sustenta seu ponto de vista de que a vagotomia já tem um lugar definido no armamentario do cirurgião moderno.

The *Iliad* is great because all life is a battle; the *Odyssey* because all life is a journey, and the Book of Job because all life is a riddle.

—*Chesterton*

Pilonidal Sinus

Etiology of Recurrence

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SURGICAL treatment of pilonidal sinus is frequently complicated by postoperative recurrence. The purpose of the present study is to evaluate certain factors responsible for this recurrence on the basis of observations made at a large military general hospital. A section on pathology will discuss and compare the histologic character of surgical specimens obtained from patients with initial and recurrent pilonidal sinus. A second section will evaluate the clinical aspects of pilonidal disease and the surgical technic used in 247 cases.

Prior to 1924, Stone[1] could find less than a dozen articles on pilonidal disease occurring in the preceding sixty years. In the past twenty-five years many reports have been published, but, with the exception of a few,[2] no confirmation of the clinical diagnosis by histologic study was obtained. The clinical history and physical observations as a general rule have been accepted as sufficient evidence to establish the diagnosis. Conclusions drawn from any such series which have not been confirmed by histologic study introduce a statistical error, since in 3.5 per cent of cases in the present series a diagnosis other than pilonidal sinus was made when sectional examination was done.

PATHOLOGIC PICTURE

A discussion of recurrent pilonidal sinus should begin with a definition of terms frequently used in describing this entity. "Pilonidal" is derived from the Latin "pilus" (hair), plus "nidus" (nest).[3] The chief characteristic of the disease is the presence of a tract in which are collected the products of dermal activity.[4] Though the disease may occur in many areas of the body,[5] common clinical usage has limited the term "pilonidal sinus" to most draining lesions in the sacrococcygeal area. The term "recurrent" is added to the diagnosis when a draining lesion is observed after surgical treatment of pilonidal sinus. The factors responsible for this recurrence have been extensively investigated. The histologic character of the recurrent lesion, according to some observers,[6] reveals the factors responsible for recurrence, these being dermal elements remaining as a result of incomplete extirpation of the sinus tract during the initial operation.[7] Because of this teaching it has been postulated that when a sinus reappears in a site previously subjected to operation for pilonidal sinus, the recurrent sinus represents a return of the original condition together with its histologic characteristics. Kleckner[8] and other investigators[9] have maintained that many of these recurrences are due to inadequate after-care. Other investigators contend that recurrence is due to neglect of surgical principles in closure of the operative wound.[10] One group maintains that the histologic nature of recurrent pilonidal sinus has etiologic significance; another group holds that clinical factors are primary in producing recurrence.

The present study evaluated the proportionate importance of the two divergent opinions, and was begun with an analysis of the histologic character of pilonidal disease. Surgical specimens from initial and recurrent sinuses were sectioned, examined and compared. For the purpose of comparison, three cellular components, hair, epithelium and type of inflammation, were statistically evaluated as to degree of presence in each type of case. The hair component was limited to that found in the

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granulation tissue or below the derma. Significance was ascribed only to that hair which was enveloped by a cuff of inflammatory tissue, with destruction of either the follicle or the shaft. The epithelium component was that bordering upon a sinus or cyst observed deep in the surgical specimen and below the derma. Three types of inflammation, acute, chronic and mixed, were arbitrarily chosen for study. The acute type was considered present if a histologic section showed preponderance of polymorphonuclear cellular infiltration. The chronic type was noted if the sections showed lymphocytes, giant cells, small round cells and plasma cell infiltration. The mixed type consisted of sections in which the cellular elements common to the acute and chronic types were present in approximately equal proportions.

The source material consisted of 555 surgical specimens obtained from 641 consecutive pilonidal surgical procedures in the sacrococcygeal region over a period of six years (1943-1949) in a military general hospital. Only 2 of the patients were Negroes, which confirmed the low racial incidence already noted by other authors.[11] It is interesting to note that, of the surgical specimens obtained, only a few (56) were subjected to laboratory examination limited to gross description. Of this small group, almost three-fourths (71 per cent) revealed the presence of hair. which observation is in close agreement with that encountered in the microscopic analysis. This similarity should not imply that microscopic study is not necessary for confirmation of clinical diagnosis (see table).

Though all specimens submitted to the laboratory were grossly diagnosed as pilonidal sinus, microscopic tissue examination in a few (17) gave negative results for the presence of any pathologic change. When surgical specimens from patients with pilonidal disease are not submitted and when the laboratory examination of some specimens is limited to gross description, no histologic confirmation of the clinical diagnosis exists. Conclusions based on a series lacking this confirmation may have an inherent factor of a 3.5 per cent error. Malignancy, though rare,[12] has been reported as a complication of pilonidal disease,[2b] the diagnosis having been discovered only by microscopic examination.

Histologic Data of Initial Cases.—Kooistra[2c] reported hair in 52 per cent of 89 sections examined. The present study revealed it to be present in almost three-fourths (72 per cent) of 422 sections. Epithelium was present (44 per cent) and absent (56 per cent) in roughly equal proportions. The ready destruction of epithelium by inflammation[2c] as compared to the resistance of hair to the same process explains the difference in incidence of the two components. Chronic inflammation was the predominant type of reaction present (60 per cent), with the mixed type (38 per cent) and the acute type (2 per cent) following in order. The sound principle of not subjecting an acutely inflamed area to radical operation[13] explains why so few surgical specimens were submitted which revealed this latter type of reaction. Some specimens (82) did not display either epithelium or hair but consisted entirely of inflammatory tissue. These sections, about 17 per cent of the series, were classified as confirming the diagnosis of pilonidal sinus in spite of the absence of dermal products. Had they not been so listed, the statistical error of 3.5 per cent would be raised to 22 per cent. From the foregoing description and statistical analysis, it is reasonable to assume that microscopic examination of an initial pilonidal sinus will show hair, chronic inflammation and an epithelial-lined sinus tract, in order of frequency.

Histologic Data in Cases of Recurrence.—Of the group examined (77), less than one-half (43 per cent) demonstrated hair. This incidence is not as great as that reported by Kooistra,[2c] who noted hair as present in 9 of 12 cases. Epithelium was noted in only 19 per cent. The destruction by inflammation plus extirpation at the time of the initial operation may ex-

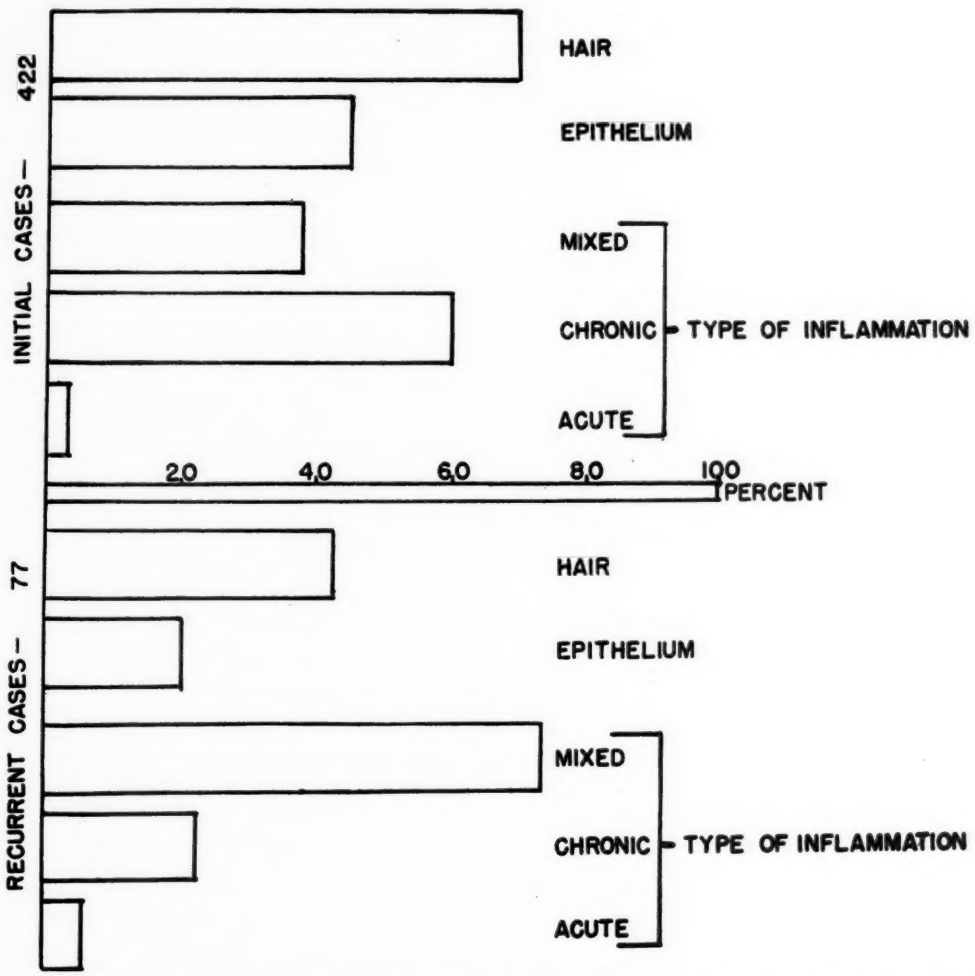

Chart 1.—Histologic component incidence.

plain the low dermal component incidence found in these specimens. The type of inflammation present was noted to be mixed (74 per cent), chronic (22 per cent) and acute (4 per cent).

Histologic Comparison of Initial and Recurrent Pilonidal Sinus.—It is now possible to note the frequency in appearance of histologic components in the two main groups of pilonidal entities (Chart 1). It is apparent that the incidence in initial cases of hair (72 per cent) and epithelium (44 per cent) is reduced in recurrent cases (43 per cent and 19 per cent respectively). Chronic infection formerly present in initial cases (60 per cent) is reduced in recurrent cases (22 per cent) and is replaced in order of frequency by a mixed type of inflammation (74 per cent). The difference in histologic component incidence between the initial and recurrent specimens has been math-

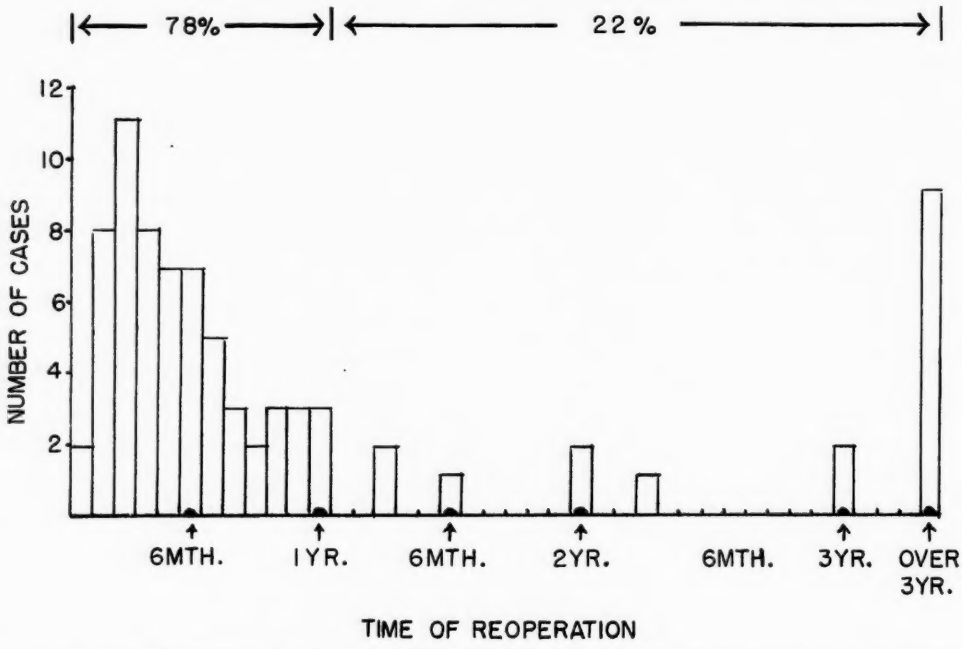

Chart 2.—Reoperation time graph.

ematically proved to be statistically significant.[13x]

Comment.—Conclusions based on the study thus far reported may be criticized for two reasons. It might be argued that the treatment of the source material is faulty, since no specimens were studied by serial section. Had this been done, the statistical figures thus far obtained might be appreciably altered. This argument is not completely true in respect to the present series, for of 499 surgical specimens sectioned, 1,759 slides were prepared for an average of approximately 3 sections per specimen. Judgment in normal laboratory practice dictates that sections be taken from areas of evident pathologic change. A minimum of two such areas in each specimen was chosen for section and one or more slides prepared from each. In this respect there was a rough approximation to the ideal of serial section study. In addition, all slides in the present series that did not reveal all of the components of hair, epithelium and inflammation were reviewed. It is felt that, until an analysis employing serial section procedures is done, such conclusions as may be drawn from the present study may act as a guide in the consideration of pilonidal sinus disease.

Another possible criticism of this study is based on the observation that hair and epithelium are destroyed by inflammation[14] and that, since inflammation is a part of the recurrent pilonidal sinus condition,[3b] it is to be expected that recurrent pilonidal sections will fail to reveal hair or epithelium. This argument was negated by the following study, which reveals that hair and epithelium are still evident in section, though inflammation has been present for three or more years. This conclusion was reached on the basis of the following observations:

1. The great majority of reoperations

are done within one year after the initial operation (Chart 2). This observation holds true only for military surgery and has little significance for application to civilian life. The majority of patients who undergo reoperation have had inflammation present for less than one year, and it is in this postoperative period that the destruction of hair and epithelium is assumed to have taken place. 2. A study was then done of surgical specimens obtained at the initial operation from patients with a clinical history of inflammation and drainage one or more years' duration (Chart 3).

Both hair and epithelium were noted to be present after a period of three years of intermittent inflammation. It is concluded that these dermal components are not readily destroyed and in the majority of cases persist in the presence of inflammation for a minimum of at least three years.

The problem of recurrence from the pathologic standpoint is now resolved into two etiologic sections. Since hair and epithelium have been demonstrated to persist in the presence of inflammation, their presence in a section taken from an excised recurrent pilonidal sinus implies that initial extirpation was incomplete. Since these components were found in a minority of recurrent sections, it must follow that epithelial remnants may well have etiologic significance in the initiation of recurrence, though not to the ex-

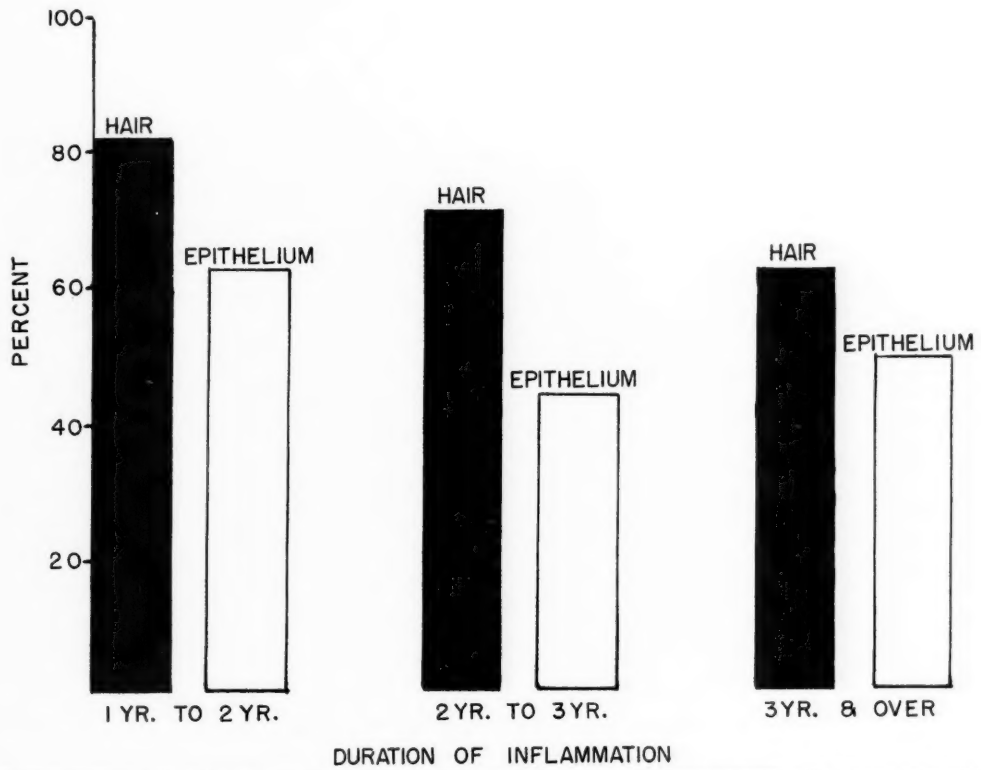

Chart 3.—Initial pilonidal sinus; hair-epithelium persistence.

tent heretofore assumed. The explanation for recurrence in the majority of cases requiring reoperation must be found in factors not concerned with initial incomplete excision of pilonidal tissue. For an evaluation of these other factors, a clinical study of the surgery of pilonidal disease was made.

CLINICAL PICTURE

A discussion of the factors involved in the recurrence rate of pilonidal disease can cover many fields. The use of sclerosing solutions,[15] catheter emplacement[16] and "medical" management[17] have all been reported as means of reducing the recurrence rate. This section will discuss certain aspects of a surgical operative technic which has reduced the rate of recurrence.

In the main, two operative technics are used in the excision of pilonidal tissue. The primary closure technic requires that the wound be closed immediately so that healing may occur by primary intention. The open method dictates that the surgical wound be permitted to heal by secondary intention. An intermediate type of closure consists of narrowing the surgical wound by partial approximation and then permitting healing by secondary intention to take place in the remaining portion. This has been included in the present study under the open type technic. The present series consists of 251 cases with follow-up data, classified as to the particular surgical technic used.

Recurrence Rates.—The determination of recurrence rates does not have to be qualified as to time, for recurrence rate percentage can only increase with the passage of time. However, an analysis noting the rate of nonrecurrence that is based on a series with less than one year's lapse of time after operation should be evaluated with caution.[10a] If reoperation was indicated for patients initially treated by primary closure, it was usually done within one year. The same was true for patients treated by "open methods" (Chart 4).

A significant number of reoperations are done, however, after one or two years. Any postoperative evaluation from a nonrecurrent standpoint can be statistically significant only if the series has a follow-up period of at least two years. Primary closure was carried out on 174 cases in this series, with a recurrence rate of 38 per cent. The percentage is similar to that reported by MacFee[11b] (32.3 per cent) and differs from that reported by Kleckner[8] (23.29 per cent) and Larsen[18] (3 per cent). In 77 cases the open method was used, with a recurrence rate of 22 per cent. This percentage approximates the figures of Rogers[19] (18 per cent), while differing with those of Kleckner[8] (1.13 per cent). The present study revealed that primary closure procedures show a higher rate of recurrence than the open method, an observation supported by previously published reports.[20] Notwithstanding this higher rate of recurrence, primary closure is frequently employed because of the short period of hospitalization and early return to gainful activity.[21] In a series of 312 surgical procedures, twice as many (60 per cent) were done by the primary method as by the open technic. That the recurrence rate for the primary technic can be lowered is possible, for some investigators have reported low recurrence rates with this method.[18]

Analysis of Primary Technic.—Investigators reporting on the primary closure technic emphasize the surgical principle of apposition of the wound margins without tension, together with the elimination of dead space, as necessary for prompt healing. To achieve these objectives, articles have been published describing minimal excision of normal tissue,[22] flaps,[23] tissue mobilization at various planes,[24] skin grafts,[25] and closure in layers.[18] The present series was examined to determine the rate of recurrence when mobilization of the fascial plane tissue was done. The level of fascial mobilization was selected as that between the deep fascia and the underlying muscle mass. All technics in which mobilization was done at any other level were arbitrarily classified as nonmobilized. In all cases in

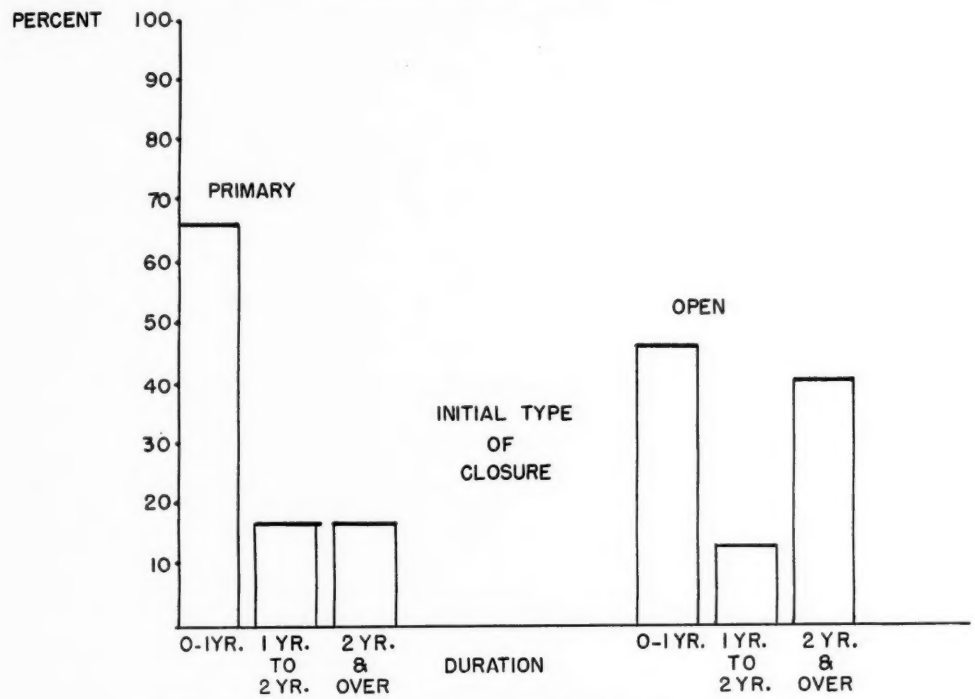

Chart 4.—Pilonidal sinus; postoperative duration before reoperation.

which the fascia was mobilized at the gluteal level, a lower rate of recurrence was demonstrated in contrast to the non-mobilized cases.

Reports of surgical technic were available for study in 109 procedures with primary closure. The fascia was mobilized in 62 of these. The recurrence rate, with a follow-up of two or more years' duration, is shown in Chart 5. It was also noted that of those cases which recurred though mobilization was done,[10b] catgut sutures were used for tissue approximation in many. It is felt that had wire sutures been used the incidence of recurrence might have been lower and the advantages of fascial mobilization made more apparent.

Analysis of Open Technic.—This method was limited as a rule to cases with a history of one or more years inflammation, or where previous primary closure had been followed by failure. There were 22 cases of the 77 with a history of failure following primary closure. These cases were treated by the open method at the time of the second operation and no recurrence was noted in a follow-up period covering six months to two years. The technic used consisted of suturing the skin margins of the surgical wound to the base of the defect as reported by MacFee.[11b]

Comment.—The recurrence rate can be reduced by the use of proper technic in closure. Before this can be done the extent of the pathologic tissue to be excised must be defined and limited.[26]

This may be done by comparing the color and character of the pale fibrotic pathologic tissue with the yellow color and firm consistency of the adjacent normal tissue. The use of methylene blue has been abandoned.[27] Complete extirpation of the sinus tract should be done, though pri-

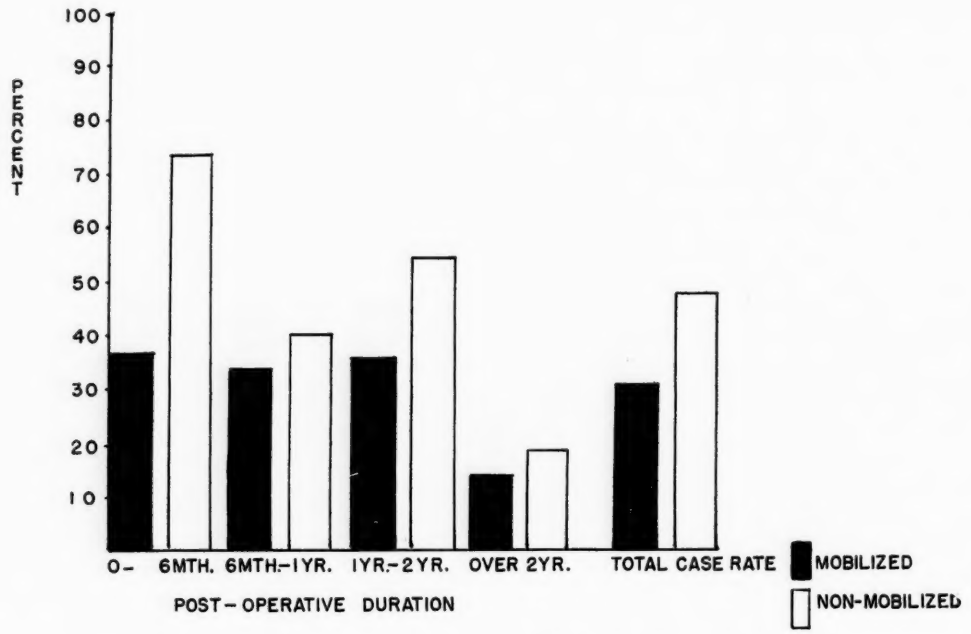

Chart 5.—Recurrence rate in mobilized and nonmobilized technics.

mary healing can still occur in the face of incomplete excision. Healing by primary intention has been present for ten months in 1 case and for two years in another, and surgical section examination in each case showed the sinus tract to open on the excision site.

The problem of wound closure cannot be solved by any one surgical method,[7a] but with proper selection of cases the advantages of primary closure over those of the open method may be utilized. Primary closure should not be done when there is a history of prolonged inflammation or when acute inflammation is present. Neither should it be used when failure has followed operation for pilonidal sinus. Primary closures must obliterate dead space, without gross approximation tension. The best means of attaining these objectives is by technics utilizing mobilization of the fascia immediately overlying muscle masses. Wound closure in obese persons must be done with care in order to prevent the formation of an ischemic scar. Minute fissures are prone to occur in these scarred areas because of trunk motions, and in time there develops an indolent ulcer which is resistant to conservative treatment. This type of case is usually classified as recurrent, the cause being due to failure in technic. The type of suture material used in closure and the technic of excision should be such as not to leave a nidus buried which may later induce a foreign body reaction.[28] Of 12 sections in the present series demonstrating foreign body reaction, catgut suture inclusions were noted in 10 and inclusions of black silk material in 2. Dunphy[29] has reported in detail on the reaction that is frequently encountered with the use of catgut. If ligature for hemostasis is necessary, a non-necrotizing emplacement is indicated, and wire suture is the material of choice. Skin margins must be approximated with meticulous care, for if continuity in apposition is disturbed, a sinus

tract will form almost invariably. The pressure of the dressing should be uniform, moderate and not subject to variation except by the surgeon.

SUMMARY

A series of 499 pilonidal surgical specimens were histologically analyzed. Of the 422 specimens from initial surgical cases, 72 per cent contained hair, 44 per cent revealed epithelium and 60 per cent showed chronic inflammation. Of the 77 surgical specimens obtained from recurrent disease, 43 per cent contained hair, 19 per cent revealed epithelium and 74 per cent showed a picture of mixed inflammation.

Hair and epithelium are resistant to inflammation and can be found in over 50 per cent of surgical specimens obtained from patients with a history of intermittent inflammation of three or more years' duration. The presence of hair or epithelium in a surgical specimen from a patient with recurrent pilonidal disease is evidence of incomplete extirpation of pilonidal tissue at the time of the initial operation.

Surgical specimens from recurrent pilonidal sinuses displayed hair and epithelium in 40 per cent of the sections. Recurrence may have been due in this 40 per cent group to incomplete excision at the time of the initial operative procedure, but in the remaining sections no hair or epithelium was noted.

Clinical factors producing recurrence were studied in a series of 251 operative procedures. For the 174 cases of primary closure the recurrence rate was 38 per cent. Of the 77 cases of closure by secondary intention, the recurrence rate was 22 per cent.

Survey Analysis

	No. of Cases	Per Cent
1. Surgical Procedures Noted	641	100
Laboratory specimens submitted	555	86.58
Laboratory specimens not submitted	86	13.42
2. Initial Surgical Cases	555	100
Laboratory specimens submitted	478	86.12
Laboratory specimens absent	77	13.88
3. Recurrent Surgical Cases	86	100
Laboratory specimens submitted	77	89.53
Laboratory specimens absent	9	10.47
4. Total Laboratory Specimens Submitted	555	100
Total complete descriptions	499	89.91
Total gross descriptions	56	10.09
5. Total Complete Descriptions	499	100
Clinical diagnoses verified	482	96.6
Clinical diagnoses not verified	17	3.40

The recurrence rate for primary closure is reduced when mobilization of fascia is carried out prior to closure of the wound. In 30 per cent of 62 cases the condition recurred, when mobilization of fascia was done as a step in primary closure technic. In 47 per cent of 47 cases recurrence took place when this step was not done in primary closure. The use of wire for sutures and ligatures will also reduce the rate of recurrence.

Open procedures are recommended for patients with an inflammation present a year or more, or when previous attempt at primary closure has failed. Twenty-two patients with a history of failure after primary closure were treated by open methods at the time of reoperation, and there has been no recurrence.

Surgical specimens obtained from patients operated on for pilonidal sinus should be submitted to the laboratory for complete histologic examination.

CONCLUSIONS

1. Primary closure employing fascia mobilization has a lower incidence of recurrence as compared with non-mobilized primary closure.
2. The primary closure technic should be limited to patients having a history of less than one year's duration of inflammation.
3. Reoperation in cases of recurrence should be limited to one of the open type technics.

RÉSUMÉ

L'auteur fait l'analyse histologique d'une série de 499 spécimens pilonidal. Parmi les 422 premiers spécimens, 72% contenaient des cheveux, 44% de l'épithélium et 60% présentaient de l'inflammation chronique. Parmi les 77 cas de récidive, 43% contenaient des cheveux, 19% de l'épithélium, 74% de l'inflammation chronique.

Les cheveux et l'épithélium sont très résistants à l'inflammation et peuvent se trouver dans 50% des cas remontant à trois années et plus. S'il y a présence de cheveux et d'épithélium dans les cas de récidive, c'est que l'extirpation initiale du kyste a été incomplète. Les coupes histologiques des cas récidivants montrent des cheveux et de l'épithélium dans 40% des cas. La récidive dans le groupe à 40% peut avoir été la conséquence d'une extirpation incomplète, on note cependant qu'il n'y a pas de cheveu ni d'épithélium dans la balance des cas.

Une étudeclinique des récidives a été faite pour 247 cas opérés. Des 174 cas, traités par fermeture primaire, il y eut 37% de récidive. Des 77 cas à fermeture secondaire, il y eut 22% récidive.

On peut réduire la récidive dans les cas guéris par première intention si l'on a soin de libérer le fascia avant de fermer. Malgré cette manoeuvre, il y eut récidive dans 30% des 62 cas. 47% des 47 cas où cette précaution ne fut pas prise, récidivèrent.

La récidive diminue aussi si l'on a soin de se servir de fil d'acier comme matériel.

On recommande le débridement dans les cas de longue durée ou lorsqu'il y eut échec. 22 patients de cette catégorie ont bénéficié de cette méthode.

On doit soumettre à l'examen histologique tous les spécimens de kystes pilonidaux enlevés.

CONCLUSIONS

1. La récidive est plus rare si on a soin de libérer le fascia dans les cas où l'on ferme immédiatement que chez ceux où on ne pratique pas ce procédé.
2. La fermeture immédiate est réservée aux cas où l'inflammation dure depuis moins d'un an.
3. Les cas de récidive doivent être opérés par une méthode de débridement ouvert.

ZUSAMMENFASSUNG

Es wird eine Serie von 499 chirurgischen Praeparaten von Pilonidalzysten histologisch untersucht. Unter 422 Praeparaten von erstmaligen chirurgischen

Faellen fanden sich 72%, die Haare enthielten, 44% die Epithel zeigten und 66% mit Zeichen chronischer Entzuendung. Von den 77 chirurgischen Praeparaten rueckfaelliger Erkrankungen enthielten 43% Haare, 19% Epithel und 74% Zeichen gemischter Entzuendung.

Haare und Epithel halten der Entzuendung stand und koennen in ueber 50% der chirurgischen Praeparate, die von Faellen mit einer drei-oder mehrjaehrigen Geschichte wiederholter Entzuendung stammen, nachgewiesen werden. Die Anwesenheit von Haaren oder Epithel im chirurgischen Praeparat rueckfaelliger Kranker ist der Beweis unvollstaendiger Entfernung des pilonidalen Gewebes beim ersten chirurgischen Eingriff.

Die chirurgischen Praeparate von rueckfaelligen Erkrankungen zeigten Haare und Epithel in 40% der Schnitte. In dieser Gruppe von 40% mag das Wiederauftreten der Erkrankung auf unvollstaenige Resektion bei der ersten Operation zurueckzufuehren sein, in den uebrigen Schnitten aber wurden weder Haare noch Epithel gefunden.

An einer Gruppe von 247 operativen Eingriffen wurden die zu Rueckfaellen fuehrenden klinischen Faktoren untersucht. Unter den 174 Faellen, die primaer geschlossen wurden, war der Prozentsatz der Rueckfaelle 37. Von den 77 Faellen mit skundaerer Heilung trat ein Rueckfall in 22% auf.

Die Haeufigkeit der Rueckfaelle bei primaerem Verschluss kann herabgesetzt werden, indem vor der Schliessung der Wunde eine Mobilisierung der Faszie ausgefuehrt wird. Unter 62 Faellen wurde ein Wiederauftreten der Erkrankung in 30% beobachtet, nachdem eine Faszienmobilisierung der primaeren Wundschliessung vorangegangen war. In 47 Faellen, wo diese Vorsichtsmassnahme unterlassen wurde, kam es in 47% zu Rueckfaellen. Die Verwendung von Draht fuer Naehte und Ligaturen traegt ebenfalls zur Verminderung der Rueckfallsrate bei.

Offene chirurgische Verfahren werden in Faellen mit ein-oder mehrjaehriger Entzuendung oder in Faellen, wo vorher ein primaerer Verschluss versagt hat, empfohlen. Unter 22 Kranken, bei denen der primaere Verschluss versagt hatte, und die dann bei der Nachoperation mit der offenen Methode behandelt wurden, trat kein einziger Rueckfall auf.

Die von Kranken mit pilonidaler Fistel gewonnenen Operationspraeparate sollten einer genauen histologischen Untersuchung im Laboratorium unterzogen werden.

SCHLUSSFOLGERUNGEN

1. Der primaere Verschluss mit gleichzeitiger Mobilisierung der Faszie zeitigt eine geringere Haeufigkeit von Rueckfaellen als der Eingriff ohne Mobilisierung.
2. Die Anwendung der primaeren Verschlusstechnik sollte auf diejenigen Kranken beschraenkt werden, die weniger als ein Jahr lang unter Entzuendungserscheinungen leiden.
3. Bei Nachoperationen rueckfaelliger Kranker sollten ausschliesslich offene Operationsmethoden angewandt werden.

RESUMEN

Se analizó histológicamente una serie de 499 muestras quirúrgicas pilosas. En 422 muestras de casos quirúrgicos iniciales el 72 % contuvo pelo, el 44 % reveló epitelio y el 60 % mostró inflamación crónica. En 77 muestras quirúrgicas obtenidas de casos recidivantes el 43 % contuvo pelo, el 19 % reveló epitelio y el 74 % mostró un cuadro de inflamación mixta.

Pelo y epitelio son resistentes a la inflamación y pueden encontrarse en más del 50 % de las muestras quirúrgicas, obtenidas de casos con antecedentes de tres o más años de inflamación intermitente. Su presencia en una muestra quirúrgica de caso recidivante es evidencia de la extirpación incompleta del tejido piloso al operarse inicialmente.

Muestras quirúrgicas de casos recidivantes mostraron pelo y epitelio en el 40 % de los cortes. En este grupo puede deberse la recidiva a excisión incompleta al operarse inicialmente, pero en los cortes

restantes no se notó ni pelo ni epitelio.

Se estudiaron los factores clínicos productores de recidiva en una serie de 247 procedimientos operatorios. En 174 casos cerrados primariamente el índice de recidiva fué del 37 %. En 77 casos cerrados por segunda intención el índice de recidiva fué del 22 %.

El índice de recidiva en los cierres primarios se redujo cuando se efectuó movilización de la aponeurosis antes de cerrar la herida. En el 30 % de 62 casos ocurrió la recidiva, cuando la movilización de la aponeurosis tuvo lugar preliminarmente en la técnica de cierre primario. En el 47 % de 47 casos hubo recidiva cuando esto no se hizo en el cierre primario. El uso de alambre para sutura y ligadura reducirá también el índice de recidiva.

Se recomiendan los procedimientos abiertos en casos con antecedentes inflamatorios de uno o más años de duración, o cuando fracase el intento previo de cierre primario. Veintidos pacientes con antecedentes de fracaso consecutivo al cierre primario se trataron con métodos abiertos al ser reoperados y no hubo ninguna recidiva.

Muestras quirúrgicas obtenidas de pacientes operados por senos pilosos se enviaron al laboratorio para examen histológico completo.

CONCLUSIONES

1. El cierre primario empleando movilización aponeurótica tiene una baja incidencia de recidiva comparado con el cierre primario sin movilización.

2. La técnica del cierre primario debe limitarse a pacientes con antecedentes inflamatorios de menos de un año de duración.

3. Debe limitarse la reoperación en casos recidivantes a una de las técnicas de tipo abierto.

RIASSUNTO

Una serie di 499 mostre chirurgiche pilonidale furono analizzate istologicamente. Dei 422 specimen di casi chirurgici iniziale, 72% contenevano capelli, 44% rivelavano epitelio e 60% mostravano infiammazione cronica. Dei 77 pezzi chirurgici ottenuti da casi recidivi, 43% contenevano cappelli, 19% rivelavano epitelio e 74% mostravano un quadro d'infiammazione mista.

Capelli ed epitelio sono resistenti ad infiammazione e possono trovarsi in sopra di 50% dei pezzi chirurgici ottenuti da casi colla storia di durata di tre anni o piú d'infiammazione intermittente.

La presenza di capelli od epitelio nello pezzo chirurgico da un caso recidivo e' p r o v a d'estirpazione incompleta del tessuto pilonidale al momento della chirurgia iniziale.

Mostre chirurgiche dai casi recidivi facevano vedere capelli ed epitelio in 40% delle sezioni. Recidivo pote'essere convolevole in questo gruppo di 40% ad eccizione incompleta al tempo di chirurgia iniziale, ma nella sezioni rimanente non si notava capelli ad epitelio.

Fattori clinici producendo recidivo furono studiati in una serie di 247 procedimenti chirurgici. Dei 174 casi serrati primitivamente, il rango recidivo fu 37%.

Dei 77 casi chiusi ad intenzione secondaria, il rango recidivo fu 22%.

Nelle chiurure primarie il rango recidivo e' abbassato quando mobilita' della fascia e' adottata priore alla chiusura della ferita. In 30% dei 62 casi la condizione ricorreva quando mobilitazione della fascia fu fatta come un passo nella tecnica della chiusura primaria. In 47% dei 47 casi recidivo accade' quando questo passo non fu fatto nella chiusura primaria L'impiego di filo metallico per sutura e legatura anche abbassera' il rango recidivo.

Procedimenti scoperti sono raccomandati nei casi colla storia di durata d'infiammazione un anno o piu' o quando l'attentato precedente a chiusura primaria falli'. Ventidue pazienti con anamnesi di fallimento seguente chiusura primaria furono trattati da metodi scoperti al momento di rioperazione senza ricorso.

Mostre chirurgiche attenuti da pazienti operati per seno pilonidale dovrebbero

essere sommessi al laboratorio per esamina istologica completa.

CONCLUSIONI

1. Chiusura primaria impiegando mobilitazione fasciale ha incidenza piu' basso a paragone di chiusura primaria senza mobilita'.
2. La tecnica di chiusura primaria dovrebbe essere limitata ai pazienti avendo la storia d'infiammazione meno durata d'un anno.
3. Rioperazione su casi recidivi dovrebbe essere limitata ad un tipo di tecnica scoperta.

SUMARIO

Uma serie de 499 especimes de cistos pilósos foi histologicamente examinada. Entre 422 especimes de casos cirúrgicos iniciais, 72 por cento continham cabêlo, 44 por cento revelaram epitélio e 60 por cento evidenciaram inflamação crônica. Entre os 77 especimes cirúrgicos obtidos de casos recurrentes, 43 por cento continham cabêlo, 19 por cento revelaram epitélio e 74 por cento demonstraram inflamação mista.

Cabêlo e epitélio são resistentes á inflamação e podem ser encontrados em mais de 50 por cento de especimes obtidos de casos com uma história de 3 ou mais anos de duração ou de inflamação intermitente. A presença de cabêlo ou epitélio em um especime cirúrgico de um caso recurrente revéla extirpação incompléta do tecido pilôso por ocasião do áto cirurgico inicial.

Especimes cirúrgicos de casos recurrentes não possuiam cabêlo e epitélio em 40 por cento dos córtes histologicos; A recurrencia póde ter se dado neste grupo devido a incompléta excisão durante o ato cirúrgico inicial, mas nos remanescentes córtes nenhum cabêlo ou epitélio foi notado. As causas clínicas productôras de recurrencia foram estudadas n'uma serie de 247 operações. Nos. 147 casos primários em que se praticou o fechamento primario a taxa de recurrencia foi de 37 por cento. Entre os 77 casos cicatrizados por segunda intenção, a taxa de recurrencia foi de 22 por cento.

A taxa de recurrencia em fechamento primário é reduzida quando a mobilização do fascia é executada antes do fechamento da ferida. Em 30 por cento de 62 casos de recurrencia houve contudo mobilização previa do fascia. Em 47 por cento de 47 casos de recurrencia for observado que a mobilização prévia do fascia não havia sido praticada. O uso de arame para sutura e ligadura reduz tambem a taxa de recurrencia.

Processos abértos são recomendados em casos nos quais se registra inflamação de mais de um ano ou quando a tentativa de fechamento primario fracassou. 22 pacientes com uma historia de fracásso de fechamento primario foram tratados por processos abértos ao tempo da reoperação e não houve recurrencia em nenhum deles. Os especimes cirúrgicos obtidos de pacientes operados por cistos pilósos devem ser remetidos ao laboratório para compléto exame histológico.

CONCLUSÒES

1. O fechamento primário quando se emprega a mobilização do fascia tem uma taxa menor de recurrencia quando comparado com fechamento primário sem mobilização.
2. A técnica de fechamento primário deve ser limitada a pacientes com uma história de menos de um ano de duração ou inflamação.
3. A reoperacão nos casos de recurrencia deve ser limitada a uma das ténicas de tipo abérto.

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Every year we grow a knot, like the bough of a tree; some branch of our intelligence expands, or else it withers and hardens.

—*Joubert*

Recurrent Inguinal Hernia

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ONE need never apologize for discussing recurrent inguinal hernia with any group of surgeons. All of us encounter it, and most of us admit, although hesitantly, perhaps, that a few recurrences follow our own repairs. The study of recurrent inguinal hernia presents a practical surgical problem involving anatomy, physiology, surgical technic, and the economic status of many persons under diverse circumstances. During the early years of this century the recurrence rate after inguinal hernioplasty was variously reported as ranging from 30 to 50 per cent. This certainly was a great factor in the deluge of surgical technics which have been offered to the surgeon for the safe and permanent repair of inguinal hernia, regardless of size or inguinal tissue dispersion, and the resultant inevitable statistics to prove each one superior. The numerous methods of repair bid fair to supersede those evolved for suspension of the uterus in midpelvic air, to the satisfaction of both surgeon and patient.

At present it is agreed by a large number of surgeons that the recurrence rate following inguinal hernia repair approximates 12 per cent, but here, unfortunately, one is confronted with the fact that many patients, when a hernia recurs after treatment, are inclined to seek a different surgeon to repair it.

Among the many factors contributing to the recurrence of inguinal hernia, the degree of knowledge of the operating surgeon must be considered. Unfortunately, in recent years the physiobiologic aspects of surgery have been overemphasized and the anatomic basis of surgical technic somewhat neglected; this handicaps many young surgeons by depriving them of a thorough fundamental knowledge of the structures to be repaired. All too often the old aphorism of coaptation without strangulation is thought to be too simple, an idea brought forth in sincerity but to be disregarded with impunity. It is rather astounding that many operations for hernia are assigned to junior house officers with the casual remark that their superiors are "too busy with more important operative procedures." Yet in no other field of surgery is there a greater need of basic knowledge, judgment, and surgical acumen needed than in the treatment of a complicated hernia.

The experience of most surgeons has revealed that the recurrence rate of direct inguinal hernia is much higher than that recorded for the indirect type. Some clinics report the direct rate up to 30 per cent, as compared with 7 to 12 per cent for indirect hernia. In general, one finds the recurrence of direct inguinal hernia in patients of the older age group accompanied by gradually developing attenuation of the structures, obesity, malnutrition and a decreased fibroblastic reaction.

Among the predisposing causes, both immediate and delayed, of recurrent inguinal hernia of both types one must consider: 1. The type of repair attempted. Was it adequate primarily? 2. Was the technic faulty, resulting in hematoma, nerve injury, wound sepsis or dehiscence? 3. Was the convalescence interrupted by pulmonary infection with a resultant cough, or was the patient plagued by hiccoughs? 4. Was the nutritional level near par? 5. What type of work was done after the repair? This may constitute a definite hazard and invite recurrence.

One cannot assume a dogmatic or arbitrary view as to exactly what constitutes

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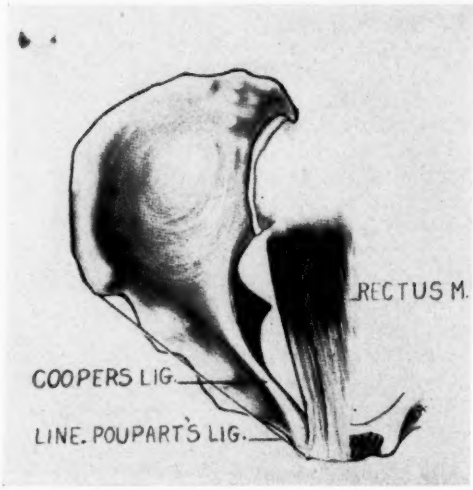

Fig. 1.—Relation of rectus tendon to Cooper's ligament and inguinal ligament. *(Holloway and Johnson, Western Journal of Surgery, Gynecology and Obstetrics, September 1948.)*

a recurrent inguinal hernia. The appearance of a hernial sac in the same location as that observed at the original operation may denote an aborted effort at high ligation of the hernial sac or, as has been noted on more than one occasion, no ligation at all. In 2 hernioplasties for recurrent hernia, to my amazement, a perfectly executed Bassini repair with cord transplantation was found, but the surgeon had forgotten to excise the sac and had transplanted the sac undisturbed with the cord. It is a rather general belief that, after a well executed high ligation of the inguinal hernia sac, it is rare—indeed, almost impossible—for the hernial sac to appear at the original site of exit, but the mere fact that this has occurred in one of my own primary repairs leads me to doubt such broad generalizations. This may be accounted for by pleading guilty to negligence in effecting a complete closure of an existing muscular or fascial defect at the internal inguinal ring.

It is rather significant that one may observe a recurrent inguinal hernia of the direct type in a patient who has undergone surgical repair of an indirect inguinal hernia only a few weeks earlier. This must lead one to conclude that at the original operation a direct hernia was present or a definite defect was coexistent in the transversalis.

The great problem encountered in cases of recurrent inguinal hernia is repair of the direct type. Most available statistics indicate that direct inguinal hernia constitutes about 10 per cent of all inguinal hernias, but for *recurrent* direct inguinal hernia the incidence is elevated to 50 per cent. The conclusion must be rather obvious; incomplete repair or failure to observe a defect in the inguinal floor eventuating in recurrence may account for a considerable part of this high rate. I am sure that many direct recurrences have followed an injudicious primary operation with superimposed surgical trauma.

In past years many surgeons in the United States and England have taught that indirect inguinal hernia, when treated by high ligation of the sac and extirpation, is cured in a high percentage of cases. This claim is being challenged by many who operated upon a great number of inguinal hernias during World War II. In many instances it was found, on careful examination, that c o n g e n i t a l weakness prevailed in the inguinal bed embodying Hesselbach's triangle, and that unless proper attention was given to reinforcement one might prognosticate an early recurrence of the direct type of hernia.

In recent years, Anson and McVay, Harkins, Bartlett, and Fallis have familiarized the profession with the use of the transversalis fascia in inguinal hernioplasty. Fallis has correctly pointed out that in the presence of direct inguinal hernia the rectus muscle becomes contracted at its inferior attachment, and the external inguinal ring is enlarged; also, the internal oblique and transversus abdominis muscles do not become fibrous until they reach the rectus sheath. This lessens the possibility of a definite conjoined tendon, thus in part destroying one of the pillars of the temple of Bassini.

Anson and McVay have shown clearly

that the transversalis fascia does not attach to the inguinal ligament, but inserts into the ligament of Cooper (superior pubic ligament) (Fig. 1). This fact has led to the popular Cooper ligament operation for repair of both in inguinal and femoral hernias, which is rapidly replacing many of the former types of inguinal repair, and with justification, based on the lowered recurrence rates reported by surgeons in widely separated centers.

From a purely technical point of view one must consider the factors concerned in primary operation upon any inguinal hernia with reference to their influence on recurrence. One cannot but be impressed by the fact that many choices and decisions made by the surgeons, from anesthesia to ambulation, have a direct bearing on success or recurrence. Any set rules or standardized procedures for hernioplasty are doomed from the beginning unless they are flexible enough to meet all situations.

Time, statistics, and results have all contributed to adoption of the use of nonabsorbable suture material in preference to the absorbable type. It is granted that many successful hernioplasties have been done with absorbable sutures, but it is the considered judgment of most herniotomists that much more satisfactory results might have been obtained had nonabsorbable sutures been used, especially in view of the comparative recurrence rate.

As to anesthesia, it would be rather easy to eliminate this choice from the surgeon's decision and shift the responsibility to the anesthesiologist, but unfortunately most surgeons cannot do so. Trained anesthesiologists are in the minority; therefore it becomes a part of the surgeon's duty to select an anesthetic suitable for his needs. Many have used procaine hydrochloride block, but I have not found it easy to perform an extensive repair by this method, although it has many virtues. Inhalation anesthesia, especially with the gases combined with curare, has many advocates, as has intravenous pen-

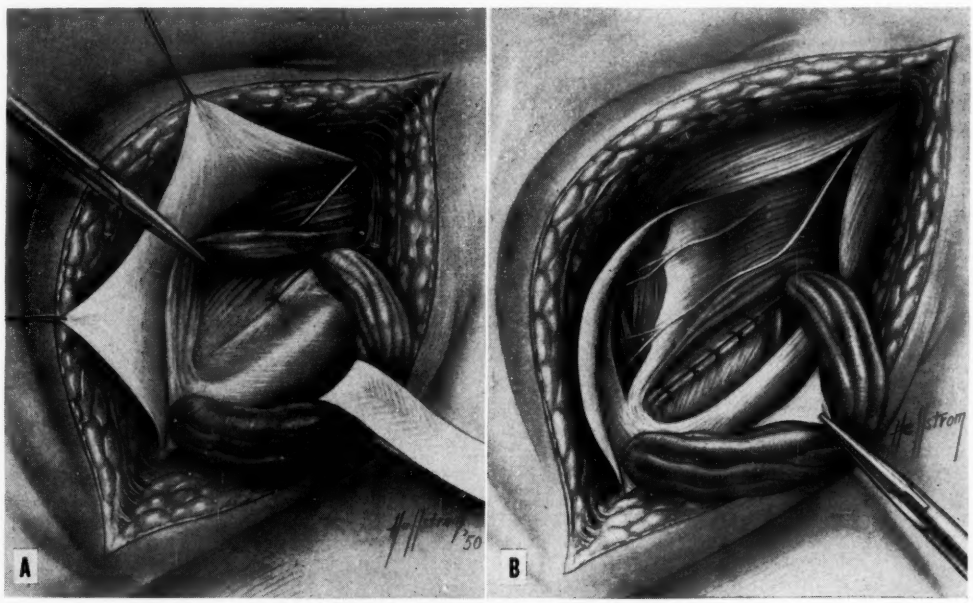

Fig. 2.—*A*, first suture placed in approximation of transversalis to Cooper's ligament. *B*, suture of transversalis fascia to Cooper's ligament, including lacunar ligament, first suture close to femoral vein. Relaxing incision.

tothal and curare. Personally, I prefer spinal anesthesia combined with pentothal for most of my inguinal hernia repairs, because of its simplicity and safety, the muscular relaxation it affords, and the resultant decrease intra-abdominal tension.

Since World War II early ambulation has become a household word; newspapers and magazines have made it as popular as "having your baby without pain, fear or drugs." To most surgeons early ambulation seems both safe and desirable, in a restricted sense, after an inguinal hernioplasty. In my opinion the patient's wishes should be consulted to some extent. I have yet to be convinced that a surgeon who rushes into his patient's room on the morning after the operation with a large smile on his face and joyfully bids the patient arise and walk, will be welcomed with open arms. Early ambulation has many virtues, but discretion should not be silenced, for in many postoperative patients early ambulation may spell failure in much larger type than late ambulation. Of course, every patient's postoperative potential should be evaluated, but it has been my experience that patients whose postoperative stay has averaged ten days, seven days of which he has spent up and around in his room, are dismissed in better condition and much happier.

Obviously, one encounters many more complex conditions with recurrent inguinal hernia repair as compared with initial hernioplasty: distorted anatomic relations, nerve injury, muscular atrophy, extensive fibrosis, cord atrophy and at times extensive varicosities. It is probably well to divide recurrent inguinal hernias into two large groups from the point of view of surgical repair:

1. Recurrent inguinal hernia associated with tensive atrophy of the muscle and fascia, attenuation of the accompanying structures or nearly complete agenesis.

2. Recurrent inguinal hernia in which the tissues approach the normal except for placement, retention ability and fibrosis.

The first, with extensive atrophy and inseparability of the structures in the inguinal region, has been a challenge to herniotomists for decades, and all of us have lived through many procedures for the aid, comfort, and cure of the unfortunate patients.

Fascial grafts have been the perfect answer to the problem for many surgeons, filling the void from structure to structure and forming a firm retention barrier, but for many this procedure has not been too successful. Failure may not be chargeable to the method at all times, but in some instances poor selection and faulty technic contribute to its discrediting.

Cutis grafts and whole thickness grafts have brought gratifying results in operations for inguinal hernia when a large structural defect is present. One should remember that thorough preparation of the skin is a strict prerequisite for the graft, to eliminate wound infection which may negate a perfect repair.

Tantalum mesh, as advocated by Koontz and Throckmorton, seems to offer great possibilities in the closure of large inguinal defects. Its ease of sterilization, pliability, lack of unfavorable reaction when buried, ease of fitting in the defect, and supporting qualities for fibroblastic bridging must be considered in this type of repair. I have used it in the repair of large ventral hernias and recurrent inguinal hernias with complete agenesis, which had been previously repaired by less radical procedures. The results have been excellent, and I am encouraged to use tantalum mesh in the future for bridging structural defects.

During World War II there was a positive trend among many surgeons who served in military hospitals for a revision of the approach to inguinal hernia, both as to primary repair and the repair of recurrences. Primarily, I believe the reason for questioning the former approach was the flood of draftees who entered the armed services with inguinal hernias. Most surgeons mustered into military service had never before had the opportunity to observe and care for so many patients with inguinal hernias. The comparatively few seen in civilian practice or

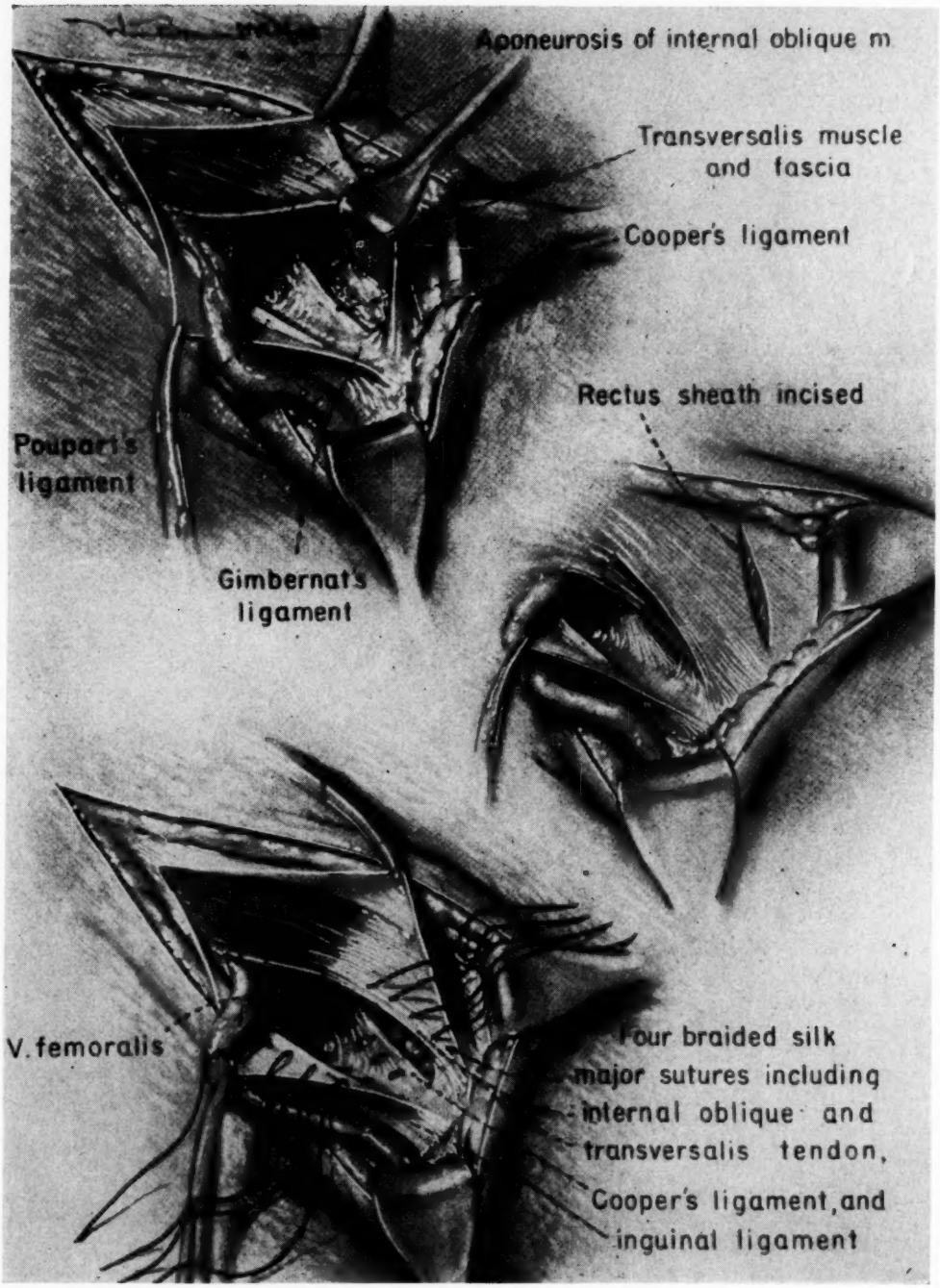
Aponeurosis of internal oblique m
Transversalis muscle and fascia
Cooper's ligament
Rectus sheath incised
Poupart's ligament
Gimbernat's ligament
V. femoralis
Four braided silk major sutures including internal oblique and transversalis tendon, Cooper's ligament, and inguinal ligament

Fig. 3.—*Upper left*, superior pubic ligament exposed. *Center right*, relaxing incision in rectus sheath. *Lower left*, sutures approximating internal oblique and transversalis tendon to Cooper's ligament and inguinal ligament. *(N. S. Rothschild, Surgical Clinics of North America, December 1947.)*

in large charity hospitals had offered no such control, comparison and opportunity for group study as were here amassed. Surgeons left the military service with varied conclusions, but all were stimulated to make a new evaluation of methods of inguinal hernia repair. Many became advocates of nonabsorbable suture material; others came home enthusiastic about the use of the transversalis fascia, and others, in great number, found Cooper's ligament to be a better "hitching post" than Poupart's, with all its years of service.

In studying a small group of recurrent inguinal hernias (Tables 1 and 2) in civilian practice, I became increasingly aware that the older conventional methods of inguinal repair for recurrent types of hernia, especially those most commonly used, might be improved. My chief concern was the repair of recurrent inguinal hernias in which the structural elements approached the normal except for placement, retention ability and fibrosis; in other words, the group more amenable to recurrent repair, the greater in number and yet probably the most poorly managed.

It has seemed to me, from a purely structural and mechanical point of view, that certain definite anatomic requirements become evident in the repair of recurrent inguinal hernias, whether direct or indirect, and that these are more important than may have been realized in the original hernioplasty. One must immediately think of the transversalis fascia as the first line of defense against increased intra-abdominal pressure; thought should be given to the restoration of its retaining power if possible, and, if this is impossible a substitute should be provided. It is common knowledge that the transversalis fascia loses its competence in Hesselbach's triangle in the presence of direct inguinal hernia and, to a lesser degree, in all recurrent inguinal hernias of the indirect variety between the epigastric vessels and the cord. It would therefore seem wise as an initial step to free and thoroughly expose this fascia from the superior margins of the internal inguinal ring down to the anterior pubic spine. In so doing the cremaster muscle should be partially sacrificed in the interest of good apposition of the medial and lateral margins.

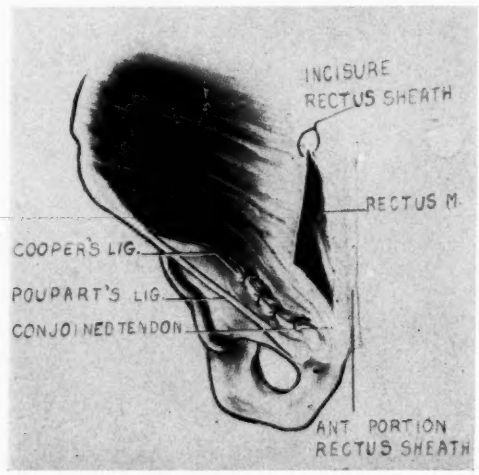

Fig. 4.—Relaxing incision of rectus sheath. Conjoined tendon sutured to Cooper's ligament. *(Holloway and Johnson, Western Journal of Surgery, Gynecology and Obstetrics, September 1948.)*

In most recurrent indirect inguinal hernias the transversalis fascia presents a definite disruption at the internal ring, which as a rule needs only simple reinforcement; yet it is neglected by many surgeons. In direct inguinal hernia the whole of the fascia must be reinforced throughout Hesselbach's triangle and sustained by a much more extensive reinforcement by the use of contiguous structures.

Prompted by the many failures of the time-honored Bassini operation and its dependence on the semimobile inguinal ligament, together with the absence, in some cases, of a conjoined tendon or the presence of a tendon that is incomplete save for a small portion at the lower reaches of the triangle of Hesselbach, I became interested in the Cooper ligament operation.

As far back as 1898, both Narath and Lotheissen advised the use of Cooper's ligament in inguinal and femoral hernio-

plasties, but it remained for Anson and McVay, on the basis of their anatomic studies, to point out some of the prevailing errors concerning the inguinal ligament and Cooper's ligament: that the normal insertion of the inguinal strata is not the inguinal ligament, but Cooper's ligament, and that the only relationship of the transversalis fascia, transversus abdominis, and internal oblique aponeurosis to Poupart's ligament is by contiguity. McVay has done much to popularize the Cooper ligament operation and prove its superior value. Harkins, in a thoroughgoing report on 367 Cooper ligament operations, did much to stimulate its use as a sound and effective procedure. Holloway and Johnson have aided materially by their studies and by use of the Cooper ligament in conjunction with the lateral tendinous border of the rectus muscle in the repair of recurrent inguinal hernias.

I have employed three variations of the Cooper ligament operation in repair of recurrent inguinal hernia, in both direct and indirect recurrence. In the first procedure (Fig. 2) I have utilized the transversalis fascia as the basement of the canal by suturing it to the ligament of Cooper with a relaxing incision in the rectus sheath. The second type of repair (Fig. 3) has been accomplished by suture fixation of the transversalis fascia and conjoined tendon in combination to the ligaments of Cooper and Poupart. The third variation in repair (Figs. 4 and 5) has consisted of a relaxing incision in the rectus sheath followed by the apposition of the tendinous lateral margin of the rectus muscle to Cooper's ligament.

TABLE 1.—*Survey of 48 Recurrent Inguinal Hernias*

Type	Number	Right	Left
Indirect	10	8	2
Direct	38	30	8
	48	38	10

TABLE 2.—*Type of Primary Operation (48 Recurrent Inguinal Hernias)*

Operation	Number	Recurrence Time Months	Years
Bassini	32		2½
Ferguson	2		2
Halsted	2		4
Hutchinson	1		1½
Andrews	3		7
Not identified	7		2
Cooper ligament	1	23	
	48		

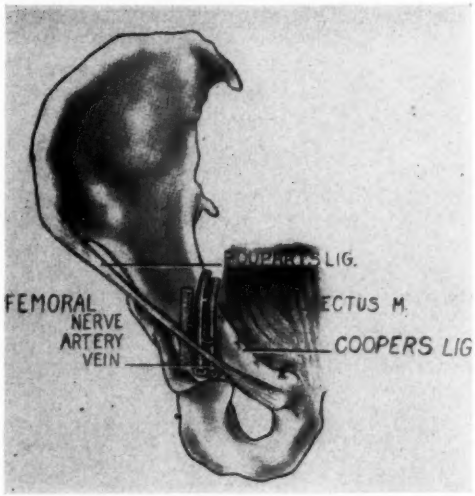

Fig. 5.—Relation of femoral vessels to Cooper's ligament in operative repair of hernia. *(Holloway and Johnson, Western Journal of Surgery, Gynecology and Obstetrics, September 1948.)*

There are several points that should be stressed with regard to any operative procedure for recurrent inguinal hernia: 1. The sac in both the direct and the indirect hernia should be opened. In the former the redundancy should be excised and the peritoneum sutured; in the latter, the incision makes for safer and higher ligation. Inversion in either I do not believe to be good practice. 2. When one visualizes the epigastric vessels without their normal covering of transversalis fascia, it is immediately obvious that a snug repair at the internal ring is necessary. 3. If one is confronted with a direct sac accompanying an indirect hernia, the technic of Hoguet may be used. By traction outward on the indirect sac, the peritoneum of the direct sac may be transposed lateral to the epigastric vessels, and the two sacs become as one. 4. Should one fail in the

Hoguet maneuver, the epigastric vessels may be divided to achieve a more satisfactory repair. 5. Relaxing incisions are much more important than has been emphasized in the literature. 6. In all modifications of the Cooper ligament operation for recurrent inguinal hernia, clear exposure of the ligament is necessary, both for good apposition during insertion of the sutures and for avoidance of injury to the femoral vein or an anomalous vessel, such as the obturator artery, which is well known for its vagaries.

CONCLUSIONS

In the author's opinion the problem of recurrent inguinal hernia, so far as operative repair is concerned, may be substantially bettered by using tantalum mesh for hernias associated with loss of tissue or atrophy of the structures in conjunction with a Cooper ligament repair. For all others he advocates the use of cotton sutures but finds no fault with those who use silk, fascia or wire.

The amount of literature that has accumulated on the repair of inguinal hernia by use of the superior pubic ligament in hernioplasty makes it evident that excellent results may be obtained with the procedure.

CONCLUSIÓN

El autor cree que el problema de la hernia inguinal recidivante, por lo que se refiere a la reparación operatoria, puede mejorarse substancialmente con el uso de malla de tántalo para aquellas hernias con pérdida de tejido o atrofia de las estructuras, junto con la reparación con el ligamento de Cooper. Cree que en todas las demás el uso de suturas de algodón constituye una práctica quirúrgica perfecta, no encontrando criticable el uso de seda, fascia o alambre.

Resalta de la literatura acumulada sobre reparación de la hernia inguinal recidivante, utilizando el ligamento pubiano superior en hernioplastías inguinales, que pueden obtenerse excelentes resultados del procedimiento.

CONCLUSIONS

L'auteur prétend résoudre le problème de la récidive de l'hernie inguinale en se servant d'une trame de tantalum, surtout s'il y a perte de substance ou atrophie des plans avoisinant le ligament de Cooper.

Dans les cas usuels, l'usage du coton comme matériel est très recommandable; de même que la soie, le fascia ou le fil d'acier.

Si l'on étudie l'abondante litérature sur la réparation de l'hernie inguinale récidivante en se servant du ligament supérieur du pubis, les résultats d'herniorraphie sont excellents.

SCHLUSSFOLGERUNGEN

Der Verfasser glaubt, dass das Problem der chirurgischen Wiederherstellung des Leistenbruchs erheblich vereinfacht werden kann, wenn in den mit Gewebsverlust oder-atrophie einhergehenden Faellen das Tantalumnetz in erbindung mit der Wiederherstellung des Cooperschen Ligaments zur Anwendung gelangt. In allen anderen Faellen haelt er den Gebrauch von Baumwollnaehten fuer ein wohlbegruendetes chirurgisches Verfahren, von dem gute Resultate erwartet werden koennen, und hat gegen die Verwendung von Seide, Faszie oder Draht nichts einzuwenden.

Aus dem Umfang der sich anhaeufenden Literatur ueber die Verwendung des oberen Schambeinbandes bei der Reparatur von rueckfaelligen Leistenbruechen geht hervor, dass dieses Verfahren zu ausgezeichneten Ergebnissen fuehrt.

CONCLUSIONI

L'A. crede che il problema di ernia inguinale ricorrente, fino al riparo operativo, si possa migliorare sostanzialmente usando garza tantalo per quelle ernie con perdita di tessuto o atrofia delle strutture in congiunzione col riparo del lagamento COOPER. In tutti gli altri crediamo che l'impiego di suture di cotone sia pratica sana chirurgica ad effettuare il riparo,

e non troviamo colpa in coloro che usano seta, fascia o filo metallico.

Evidentemente della somma di letteratura ammontato sul riparo di ernia inguinale ricorrente utilizzando il legamento pubico superiore nell 'ernioplastie inguinali, risultati eccellenti si possono ottenere dal procedimento.

SUMÁRIO E CONCLUSÒES

Na opinião do autôr o problema da hernia inguinal recurrente, no que diz respeito a reconstitução cirurgica, póde ser substancialmente melhorado com o uso da malha de Tantalum para os casos de hernia associada com perda de tecido ou atrofía das estructuras, em conjuncão com uma reconstituicão auxiliada pelo ligamento de Cooper. Para todas as outras ele advóga o uso de suturas de algodão mas não se põe contrário ao emprego de sêda, fascia ou arame.

A literatura acumulada sobre reparação de hernia inguinal recurrente com o uso do ligamento pubico superior em hernioplastía torna evidente que os melhores resultados podem ser obtidos com esta técnica.

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Management of Eye Injuries by the General Surgeon in the Absence of an Ophthalmologist

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THE human eye, although remarkably resistant to an infinite variety of traumatic insults, frequently succumbs to many of them in some degree; this applies as well to all adnexa and protective soft tissue structures.

It is wondrous that so small an area of the human body as the eye, the mediator of vision, is invested with so large a share of responsibility, not only through an individual lifetime for the development and maintenance of man's useful activities, but through the phylogenetic development of the race as a whole. The development of the function of seeing, which we all so much take for granted, must certainly to some extent be predicated on the fact that the present anterior position of each of our two eyes gradually evolved from a lateral position in our very remote ancestors, as the nasal wall of each orbit came to align itself in a near parallelism with its fellow.

The gradual evolution of progressive overlapping of the fields of vision, which, although presently incomplete, resulted in binocularity of peripheral as well as concomitant central vision, and made it possible for the whole of mankind, as represented in the individual human being, to become the first and only primate to divorce himself sufficiently from his environment to adapt it, within limits, to his requirements rather than to continue under the previous necessity of having to adapt himself to it. This profound evolutionary change, however, necessarily was accompanied by some disadvantages, since each eye, as ocular function increased in efficiency, became more vulnerable as an organ upon which mankind relied increasingly for self preservation, as well as for further phylogenetic development in a more competitively involved environment.

The ophthalmologic practitioner long since has come to regard each eye as one of two components comprising a "single" organ in that the basic function, physiologic nature and pathologic potentialities in one globe are also manifest in the other. Accordingly, injury to certain tissues (ciliary body) of one eye occasionally may produce sympathetic ophthalmia in the fellow eye.

Although the basic principles of the medical and surgical care of traumatized tissues apply to the eye as well as to other parts of the body, certain other factors must be taken into consideration by the general surgeon who is called upon to administer treatment to injured eyes and/or their adnexa if an ophthalmologist is unavailable. These factors derive not only from the peculiar specialty functions of the eye as a twinned organ but also from the fact that the globe evolves from all three embryonic tissues. The external and internal architecture of the eye, therefore, is a highly intricate mechanism, the primary purpose of which is mediation of the function of seeing as we know it. This function is maintained by an involved chemophysiologic process directed and governed by chemoneural control, and the tissues subserving it are housed securely within a roundish, closed cavity which is protected by its location in the orbital bony recesses of the facial skeleton but has relatively poor protection anteriorly against onslaught from the external environment.

Ocular trauma may range from mini-

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mal to maximal and necessarily is determined by many factors, among which the most important are the age of the patient (which frequently determines the physical status of the eye); the nature of the offending agent, its size or amount, and whether it is a liquid, a gas, or a solid.

The diversity of circumstances under which ocular injuries occur demands a pertinent history in all instances when possible. If immediate treatment is mandatory, a relevant history should be obtained as the situation develops. The level of visual acuity, or its approximation, should be determined immediately within the limits of the patient's cooperation. Roentgenographic study also should be accomplished as soon as possible, when indicated, to localize intraocular and/or intraorbital foreign bodies, as well as to determine the presence or absence of displacements or fractures of the bony structure of the face.

Since nothing that occurs in or about the eyes is without significance, even the most trivial suspected ocular injury should receive so orderly and comprehensive an examination that the subsequent record will reveal the functional as well as the organic status of the eye in question. These data also should include information concerning all procedures performed, as well as therapy administered and advised. The importance of adequate examinations and adequate records cannot be stressed sufficiently, since almost invariably the question of maintenance of useful vision is involved. Such records will serve the best interests of all concerned medicolegally, as well as sociomedically; this is especially true of industrial injuries and in questions of malpractice.

Recognition of, and obeisance to, the clinical triad of relevant history, determination of visual acuity, and roentgenographic examination, if indicated, are of primary importance not only medicolegally but from the standpoint of suggesting immediate medical and/or presurgical therapy, such as the administration of tetanus antitoxin or toxoid, antibiotics, or nonspecific foreign proteins.

Foreign Bodies.—The majority of casual foreign bodies of the cornea, especially if they become embedded in the so-called palpebral exposure area, usually give rise to only mild discomfort; however, if small particles of whatever nature, especially in young persons, become ensconced on the inferior palpebral conjunctival fold of the upper lid, multiple superficial scratching abrasions of the cornea may occur, causing a high degree of discomfort due to photophobia, lacrimation and blepharospasm of varying intensity. The protective ability of the rapidly reflexive blinking activity of the lids frequently is too slow to guard against global injury during the careless developmental years; hence, any type of trauma may be encountered in children at play. Infants and young children, however, often cause external injuries to the eyes of adults by inadvertent scratching or by the unintentional impact of playthings. Seasonally, adults in suburban communities may suffer severe scratches and corneal abrasions from twigs, a particular hazard in the spring and in the fall. Home and gardening injuries, however, usually affect only the health of the external eye.

Corneal foreign bodies, although less painful than those in the conjunctiva of the upper lid, not infrequently may produce complicating ulceration and even iritis, because the symptoms immediately following the injury often are minimal or even absent, and that early treatment is not sought. The most common extraocular foreign bodies, in the order of their frequency, are (*1*) wind-borne objects, (*2*) industrial abrasives and (*3*) splinter chips (usually metallic) from hammering. Not uncommonly, however, unexpert attempts to remove the offending particles result in complications appreciably more severe than those produced by the original injury.

Determination of the nature and extent of ocular trauma invariably is greatly facilitated by topical anesthesia. Many agents are available, but pontocaine hy-

drochloride (0.5 per cent), butyn sulfate (2 per cent), or holocaine hydrochloride (1 per cent) in the order named, are most satisfactory. The anesthetic effect of cocaine is excellent, but dilatation of the pupil follows its instillation, and in elderly persons, dessication of the corneal epithelium frequently occurs. Appropriate hypnotics may be administered to produce analgesia, but demerol also may be employed if necessary. General anesthesia is rarely required, but, when it is indicated, sodium pentothal is preferable for adults and older children. For infants, vinethane is safe and practicable, although chloroform in competent hands is equally effective.

Since the extent of any ocular injury remains unknown until examination is completed, all procedures should be conducted as gently as possible. Lid retractors of appropriate size are frequently useful. The general surgeon usually will not find it inconvenient to carry a pencil flashlight and a small loop of the Coddington type for focal illumination and magnification. This is an aid in locating corneal foreign bodies, since some foreign bodies, such as small iron-rust particles, are difficult to detect with the naked eye when they lie against an undilated brown iris. Conjunctival foreign particles, unless they are glass, usually are easily detectable.

The search for any foreign body should include examination not only of the cornea but of the conjunctival surfaces of the globe, as well as the lids and their margins. The latter may be the site of minute vesicles, especially in the presence of exacerbative blepharoconjunctivitis, or may harbor aberrant cilia as well as residual marginal chalazia and verrucous excrescences, all of which may simulate the presence of a foreign body. Also, the lumen of the upper and lower puncta occasionally may be obstructed to a lesser or greater degree by detached cilia, minute wood splinters, accretional plugs of leptothrix or streptothrix (more frequent in the upper canaliculus) or nits. The chronicity of symptoms sequential to these latter conditions readily differentiate them from the symptoms produced by agents more abruptly noxious to the external health of the eye and its adnexa.

The upper lid, no matter how difficult to grasp, invariably may be everted by directing the patient to maintain his gaze downward with both eyes open, while the examiner employs a blunt metal or glass spatula, or his own thumb or index finger, to press (gently) the skin of the upper eyelid from under the orbital margin in a backward and downward direction. The thumb and forefinger of the other hand grasp the margin of the upper lid while pulling it slightly forward in an upward direction. Replacement of the lid is readily effected by rapid elevation of gaze. Eversion of the lower lid is accomplished very simply by downward traction while the eyes are rotated upward. The procedures just mentioned permit inspection and examination of all external ocular surfaces except the upper fornix, which may be viewed in its entirety by the use of a lid retractor. This usually is necessary only when multiple foreign bodies are present, as occurs in blast injuries.

Removal of extraocular foreign particles of any type may often be accomplished with a tightly wound cotton swab which has been moistened in pontocaine, metaphen, zephiran, boric acid solution or some similar agent. A dry swab does not facilitate adhesion of the foreign body to the cotton, and it is also likely to cause greater epithelial damage. Many foreign particles, whether embedded or not, may be removed satisfactorily by lifting them away from the conjunctival or corneal epithelial surface with fine but bluntly pointed forceps especially designed for this purpose.

If this maneuver is not successful, a slightly blunted hypodermic needle, a cataract knife, a Bowman discission needle, or some similar substitute for the well known common eye spud may be employed. Hand-manipulated magnets are only infrequently useful. The conventional large, semiblunt spud, or the corneal burr, though capable of removing an extra-

ocular foreign body, also may cause additional unnecessary tissue damage, especially if too enthusiastic an effort is made to rid the cornea of the coronal rust ring that may accompany a ferrous foreign body. It will be recalled that even if corneal microsurgical intervention is accomplished with the aid of the biomicroscope (slit lamp), penetration of the membrane of Bowman, which lies underneath the epithelium, will result in permanent scarring and that if this occurs in the apical area of the cornea permanent impairment of vision will follow to some degree.

Corneal epithelization is always hastened by the application of a snugly fitting pad over the closed eyelids. It may even be necessary to apply a pressure bandage if the severity of the lesion justifies it. If epithelial dehiscence is minimal and accompanied with little or no generalized ocular reaction, neither an eye pad nor paralyzation of accommodation may be necessary; however, it is usually wise to treat losses of corneal epithelium conservatively. This may be done by the instillation of a solution of 5 per cent homatropine hydrobromide as the mildest agent, to atropine sulfate (1 to 3 per cent), or scopolamine hydrochloride to a concentration of 0.25 per cent. Antiseptic ointments also may be instilled, alone or in combination with the cycloplegics just mentioned. A slightly wet eye pad then should be applied. Complications are usually avoidable if these simple procedures are followed. Secondary medication after the pad is removed consists largely of a mildly astringent antiseptic collyrium for the following few days. Redetermination of visual acuity and, if possible, examination of the ocular fundus should be accomplished when the patient is discharged.

Burns. — Immediate severe pain and subsequent marked loss of vision usually follow contact with any one of the numerous thermal and chemical agents capable of producing burns of the palpebral and bulbar conjunctiva and of the cornea. Emergency treatment often is more efficacious the more rapidly it is instituted, and when acids, alkalies, and ammonia (the most common agents) are responsible, the instillation of castor oil preceded by copious irrigation with water or with saturated boric acid solution frequently affords satisfactory results. Specific chemical neutralizing agents too often are not at hand for immediate use; in fact, the very heat generated by such agents often contraindicates their use.

Lime, lye, and other caustic alkaline substances, such as ammonium, cause especially severe external ocular burns and require immediate and specific care to prevent or to minimize the dreaded complications of permanent corneal scarring and symblepharon. Washing with copious amounts of water is imperative, as is the removal of all residual alkali particles with a petrolatum-impregnated applicator. A buffer solution then should be instilled generously and frequently to overcome the alkaline effect.

Rapid dilatation with a solution of 3 per cent atropine sulfate and/or with 10 per cent neosynephrine after instillation of 5 per cent pontocaine hydrochloride, and irrigation with neutral ammonium tartrate or 10 per cent lactate, should be done every two hours. Ammonium, because of its volatility, tends to penetrate deeply and rapidly into the eye and may require evacuation of aqueous by paracentesis on several successive days.

The instillation of sulfonamide ointment, or ointment containing an antibiotic, or a bland ointment is necessary before an eye pad or bandage is applied. The eyes, however, must never be bandaged if a vesicant has been the offending agent.

Hydrosulphosol concentrate in castor oil, to hasten tissue respiration, should be used in the form of drops when the eyes have undergone severe chemical burns (acid or alkali); however, for recent burns it may be used as a solution in distilled water every two to three hours for the first twenty-four hours. This product also should be applied, as a spray solution or as an ointment, to the adjacent cutaneous areas. Topical application

of therapeutically active, water-soluble derivatives of chlorophyll "a" in an isotonic solution or as a hydrophilic base in ointment form is beneficial for all types of thermal and of irradiation injuries.

Sodium tetrathionate, an organic sulphur-containing solution, may be used cautiously as an intravenous adjunct for very severe burns. Rutin, given orally, may aid in reducing chemosis and local edema, but raw boiled milk given intragluteally for this purpose is more rapidly effective and also assists in combating local and systemic infection. Repeated visits are necessary to enable the examiner to prevent scarring and adhesions.

Local thermal burns, corneally or conjunctivally, frequently result in necrosis that invites infection, and the prevention of this must be the primary goal of the treatment instituted.

Actinic conjunctivitis (so-called snow blindness), acute drug sensitivities and physical allergies are best treated by administering no medication except zinc sulfanilate and epinephrine drops in combination with a saturated solution of boric acid, if indicated. Cracked ice compresses or the frequent brief application of an eye pad saturated with witch hazel may be soothing. These palliative measures also apply when mild burns of the globe or the skin of the eyelids have occurred after roentgen therapy or radium irradiation. These measures, however, do not apply to emergency care of structures of the inner eye; medical care of the latter is not feasible, although later surgical attention is frequently warranted, especially with regard to the removal of radiation cataract.

Lacerations.—Lacerations of the lids are among the more common ocular wounds. Early and adequate care of these will usually preclude later, more formidable plastic procedures except in those instances in which there are associated perforating injuries of the globe. The degree of severity of eyelid burns, of whatever cause, will determine the extent and nature of both local and systemic treatment. Since contamination of the burned or lacerated areas is almost invariably present or to be expected, it is most important to cleanse the wound, not with irritating antiseptic solutions, but with physiologic solution of sodium chloride after gentle washing with tincture of green soap and water. Wounds involving the deeper structures of the tarsus and orbicularis should be closed with interrupted No. 4 0 or 5 0 plain catgut sutures, and the skin by No. 6 0 black silk sutures on curved atraumatic needles. No sutures should be placed until the necessary débridement has been effected. Good lid function usually will ensue without cicatricial entropion or ectropion if closure layer by layer has been done. Extensive loss of tissue will necessitate plastic procedures, even including pedicle flaps, but the latter may eventually present numerous problems in those instances in which flash burns have been so extensive that the skin of the chest and arms also has undergone destruction. Appropriate pressure dressings are usually indicated. In general, however, the earlier adequate treatment is instituted, no matter how severe the injury, the more quickly will occur the return to as nearly normal a functional level as is possible.

Penetration and Perforation.—Penetration by a foreign body of one or more of the external tunics of the eye is a term that also is applicable with reference to the internal ocular structures but, if the foreign body succeeds, after ingress, in effecting egress, the resultant injury necessarily must be characterized as a perforating wound. The surgical distinctions involved are those of degree, although the through-and-through wound usually causes the greater trauma. Foreign particles that penetrate or perforate the globe, whether by first traversing the eyelid or by way of the globe directly, manifest a greater selectivity for the cornea because this structure presents the greatest amount of exposed tissue for receptivity of the entering agent.

Penetration may be confined to one or more of the external tunics of the eye; however, if only the conjunctiva suffers

trauma from this type of wound, fine black silk on atraumatic needles will effect proper surgical repair. Hospitalization usually is required if the sclera or the cornea undergoes penetration. Uveal tissue, or vitreous, if prolapsed through the wound, must be cleanly removed with closely applied fine sharp scissors, curved on the flat, prior to suturing of the sclera.

Small penetrating corneal wounds, if there is no herniation of iris tissue or of lens or vitreous substance, especially if there is no manifest aqueous leakage, may often be treated only by the instillation of atropine and the application of a snug eye pad; however, they may occasionally require closure by very fine black silk sutures and the use of special forceps to avoid corneal tissue crushing with subsequent scarring.

Ragged and gaping corneal wounds usually require conjunctival apron flaps or sliding conjunctival ribbons, which must be secured by conjunctival sutures after adequate coverage of the cornea has been effected. Any protruding intraocular prolapsed tissue, however, must be excised first. Under no circumstances must any extruded intraocular tissue be replaced, no matter how desirable or sensible this may seem at the moment. It usually is good practice, when repair of the cornea and iris is necessary, to inject a bubble of air into the anterior chamber to effect reformation of the chamber, as well as to prevent adhesions between the iris and the posterior corneal surface. Free blood may be removed from the anterior chamber by gentle irrigation of the latter with warm physiologic solution of sodium chloride, although great care must be exercised to avoid injury to the lens. Coagulated blood usually should not be disturbed, even with a fine forceps through a wide corneal incision, if it does not wash away readily.

Since some corneal perforations result in penetration also of the crystalline lens with formation of a traumatic cataract, it may be necessary to consider lavage or so-called linear extraction of the flocculent lens substance; however, when the amount of this now foreign material is small and obviously does not occupy much of the anterior chamber, it is advisable to leave well enough alone. Absorption will usually occur, but on occasion the flocculent particles may be so numerous and so swollen that lavage may become necessary to prevent the occurrence of painful secondary glaucoma.

Complications.—One or more of a number of intraocular lesions may occur as sequelae to contusing or penetrating injuries of the globe. These are: hemorrhage into the anterior chamber; traumatic iritis; rupture, iridodialysis, or paralysis of the iris, and aniridia; dislocation (subluxation) of the lens; commotio retinae; disorganization of the vitreous, or its detachment; retinal detachment, and traumatic chorioretinitis. Choroidal rupture may occur as a result of a contrecoup injury. Avulsion of the optic nerve may occur as a result of perforating injuries or of intraorbital trauma such as may follow bullet wounds, penetration by iron spikes or knitting needles, or ill-advised or poorly performed operations on the maxillary sinus. High voltage electricity, as in lightning shocks, may result in reduced visual acuity, but it is usually only secondary to slowly absorbed hemorrhages of the subarachnoid type induced by the current itself.

Any or all of these manifestations of trauma may occur singly or in combination, and will require relatively prolonged treatment which permits the patient to be referred as soon as possible for specialty medical or surgical care, or both.

Hemorrhage into the anterior chamber, especially if so extensive as to obscure any least view of the iris or the fundus, and if there appears no indication of prompt absorption during the ensuing two days, may yield to irrigation or removal of the clots after paracentesis with a small keratome. Failure to free the eye of this extravascular blood often results in secondary glaucoma or permanent blood staining of the cornea, or both. Traumatic iritis, unless secondary glaucoma stubbornly intervenes, usually will yield to

ophthalmomedical care alone. This treatment embraces atropinization, foreign protein therapy, the administration of salicylates and, for penetrating and perforating lesions, precautionary administration of an antitoxin after proper sensitivity precautions, as well as appropriate foreign protein therapy (typhoid-paratyphoid vaccine and raw boiled milk).

Subluxation of the lens, if minor, usually requires no treatment; but, if the lens becomes dislocated anteriorly, extraction with the lens loop is frequently necessary. If the lens is lost posteriorly and cannot be removed readily with the loop or by transfixion, the resulting uveitis and/or secondary glaucoma may necessitate enucleation—not only for the relief of pain but to prevent the occurrence of sympathetic disease in the fellow eye. Retinal detachment, statistically, regardless of its traumatic causation, is most likely to occur in myopic and elderly persons, especially those who have cystic disease of the retina. Thus, seemingly trivial ocular injuries in persons of this type should be observed at more frequent intervals post-traumatically than is necessary for younger, healthier persons with previously normal eyes. In the main, cure of separation or detachment of the retina is more apt to be effected the earlier one resorts to surgical intervention.

Massive hemorrhage into the vitreous is best treated by advising normal physical activity, the maintenance of the best possible health, and the immediate administration of rutin to tolerance, or to 1,000 mg. daily. Vitreous detachments are not amenable to treatment; however, their presence may presage the occurrence of retinal detachment at some future time. Choroidal ruptures do not lend themselves to surgical repair.

Deformation of the pupil, whether due to permanent dilatation because of rupture of the iris sphincter or detachment at its root, both of which conditions may follow severe contusion of the eye, usually requires no treatment other than acceptance of the situation on the part of the patient; however, very severe degrees of iridodialysis may require surgical conversion into one pupillary opening by means of iridectomy if monocular diplopia is excessively annoying.

Sympathetic ophthalmia, an inflammatory disease occurring in an uninjured fellow eye, although currently rather infrequent, is believed to be altogether preventable if the injured eye, hopelessly damaged and blind, can be removed at once. This procedure is recommended because ultimate sympathetic disease may not supervene for weeks, months, or even years (it is believed never to occur earlier than the tenth day after injury). This interval, however, permits a careful study and decision concerning the necessity for enucleation.

The relentless course of sympathetic ophthalmia, which runs the gamut of inflammatory signs and symptoms and through secondary glaucoma, complicated cataract and ultimately pthisis bulbi, should stimulate the surgeon to insist upon removal of the injured eye, especially the hopelessly injured eye and particularly when the penetrating injury has occurred in the region of the ciliary body. This area extends circumferentially for a distance of 8 mm. around the cornea. In general, it occurs within the first month after injury, is most frequent in children and is fairly uncommon after three or more months have passed. Its cause is obscure, although allergy of the uveal tract is often held responsible. Treatment serves more to delay the ultimate hopeless result than to restore visual capacity to normal, and, as is true of the many predicated etiologic factors, the variety of treatments proposed attests to their essential inefficacy.

Perforating, or through-and-through ocular injuries, are very rare in that, except for those occasioned by gunshot and war wounds, the offending foreign body must be of such peculiarly high velocity, small size and high temperature that only the bony wall of the posterior orbit stops its further progress after it has traversed the globe. Most perforating wounds of the eyeball, if they do not im-

mediately cause destruction and loss of function, usually result in no more serious an injury than a traumatic cataract, which may be treated surgically at a selected date in the future.

The majority of penetrating ocular wounds are caused by small metallic objects that enter the eye with great force. These are most frequently magnetic and almost invariably lend themselves to removal, either posterior or anterior to the iris, by early and expert use of the giant magnet. In the absence of a Berman localizer, they may be located by roentgenographic study and three-dimensional charting of the foreign body on an appropriate chart, which then indicates the surgical approach.

Stainless steel, it should be mentioned, is not magnetic unless it has been machined or milled or has been roughly handled by chipping or pounding. Intraocular retention of steel or of iron foreign bodies, by oxidation, causes siderosis with ultimate pthisis after a period of many years during which depigmentation with superimposition of a greenish hue of the tissues has occurred. Copper fragments produce chalcosis, which also results in pthisis bulbi and which usually necessitates eventual enucleation. Lead and glass are much better tolerated, and plexiglass and other clear plastic fragments are frequently well tolerated, with retention of essentially useful vision, although the particles may remain fully visible within the eye. Some foreign bodies, such as wood, may not be visualizable roentgenographically or even ophthalmoscopically, but a soft tissue technic employing dental plates may render them roentgenographically visible, thus facilitating their surgical removal.

Rapid and efficient sterilization of ocular instruments, especially those to be employed in entering the globe itself, may be effected according to the method of Post. Only thirty seconds of immersion for clean instruments and four and a half minutes for "dirty" instruments are required if the following solution is employed for the sterilizing process:

Liquor cresolis compound	8 cc.
Oil of lavender	2 cc.
Thymol crystals	2 Gm.
Ethyl alcohol 95 per cent	88 cc.

The general surgeon not infrequently encounters ocular medical problems arising from, or associated with, the rapid or sudden loss of sight in one or both eyes. The symptoms of loss of sight, although somewhat similar from instance to instance, derive from a great variety of diverse causes. This diversification, however, is more a matter of degree than of kind. Detachment of the retina, for example, may have been present for varying periods prior to its relatively rapid appreciation by the patient. Conversely, it may unequivocally be causally related to a specific incident of lesser or greater trauma.

Rapid and sudden darkening of the entire field of vision (usually unilateral) is most often sequential to massive vitreous hemorrhage. This hemorrhage, in the absence of trauma, most frequently follows advanced diabetic retinopathy or atherosclerosis, or both. It may be accompanied by some degree of reddishness of imagery.

The onset of rapid or sudden elevations of intraocular fluid pressure is always accompanied by marked discomfort and diminution in vision but usually concomitant with acute ocular pain and marked loss of visual acuity. The pain may be only local, but not infrequently it is referred elsewhere—so peripherally that it may even simulate the pain of an acutely diseased appendix. Such glaucomatous episodes are classifiable as hemorrhagic and/or congestive and may represent an isolated occurrence or the exacerbation of a preexisting glaucomatous state. Since the anterior chamber usually is extremely shallow or even absent, immediate surgical relief is best afforded by sclerotomy or sclerectomy of the inferotemporal quadrant of the involved globe, after which, in a few hours or a few days, an appropriate anterior segment operation may be performed with far less risk than if it had been done as the original surgical procedure. However, medical

treatment for acute glaucoma frequently is much more satisfactory than surgical intervention, especially if instituted within and up to the first twelve hours after onset of the acute episode. Among these measures are the intravenous administration of 25 to 50 cc. of 50 per cent dextrose solution, to which may be added 5 cc. of physiologic solution of sodium chloride; or a single intravenous injection of sorbitol up to 25 cc.; retrobulbar injections of solutions of procaine and epinephrine; crushed ice compresses; and the frequent instillation of 5 per cent to 10 per cent pilocarpine nitrate (as often as every five minutes); but never, particularly if the anterior chamber is very shallow, any instillation of eserine salicylate in any concentration. In general, operation should not be delayed beyond twelve hours if there has been minimal response or no response to medical measures.

Obstruction with complete closure of the central artery of the retina usually brings about total blindness, since deprivation to the retina of the arterial blood flow cannot exist for more than five minutes without death of the sensory elements. Central venous obstruction also usually abolishes useful vision. Tributary branch closures of retinal arterioles or of retinal veins usually eventuate in destruction of visual usefulness in the distribution or drainage sectors involved. Current therapy offers some questionable benefit. Dicumerol, vitamin K or rutin is administered quickly in high doses for relatively short periods as indicated.

The optic neuritides, whether retobulbar or located within the scleral foramen, are most frequently regarded as deficiency diseases in which high proteinization and intensive vitaminization constitute the indicated therapy. Binocular loss of vision occurs in approximately 10 per cent of cases; however, retinal edema in the acute hypertensive phase of chronic glomerulonephritis, as well as in the hypertensive toxemia of pregnancy or as the result of retrobulbar neuritis in hyperemesis gravidarum, constitutes a dramatic episode, the history of which will indicate its cause and will lead to proper diagnosis and thus direct the course of appropriate, immediate therapy.

Diabetes mellitus is the only metabolic disease that will produce such rapid alterations in visual acuity that, to the patient, they will seem sudden and ominous. These changes are due to the acute myopia that occasionally occurs in diabetic patients owing to the myopia that they experience after a rapid loss of fluid from the intraocular crystalline lens. In rare instances visual acuity, more qualitative than quantitative and more peripheral than central, may occur premenstrually, as well as in the first two days of menstruation proper. This symptom occasionally is pathognomonic of a chromaphobe adenoma of the pituitary gland and requires detailed special diagnostic study.

Inflammatory intraocular diseases are frequently obscure in their origin and usually do not result in rapid deterioration of vision. However, diminution of sight in a previously normally seeing eye will occur sufficiently often in the presence of focal sepsis, syphilis, tuberculosis, Boeck's sarcoidosis, arthritis and the exanthemas that the general surgeon and practitioner should be cognizant of these possibilities.

Hypertensive and atherosclerotic diseases manifest themselves by retinopathic conditions in the eyegrounds, as does preeclamptic hypertensive toxemia, diabetes and certain blood dyscrasias, but only as a manifestation in some degree of the advanced abnormal physiologic picture. The observable alterations not only are essentially organically irreversible but, in their very development, effect depressions in degree of visual acuity. This dysfunction usually is insidious and not rapid, although the patient, particularly if he has one eye, may suddenly become aware of some degree of malfunction of this special sense organ and thus bring to the practitioner a problem that, in its immediacy, appears to be one of urgency. In the main, however, the treatment of local and systemic medical diseases affecting vision

does not lie within the province of the general surgeon, since these diseases do not constitute ocular surgical emergencies as such.

SUMMARY

The author discusses various injuries and diseases of the eye from the point of view of the general surgeon who may be called upon to act in the absence of an ophthalmologist. These conditions include foreign bodies, burns, penetration, perforation, laceration, hemorrhage, retinal detachment and various other entities. Practical suggestions for therapy are presented.

RESUMEN

El autor discute diversas lesiones y enfermedades del ojo desde el punto de vista del cirujano general, quien puede ser llamado para actuar en ausencia de un oftalmólogo. Estos estados incluyen cuerpos extraños, quemaduras, penetración, perforación, laceración, hemorragia, desprendimiento de la retina y otras diversas entidades. Se presentan sugestiones prácticas para la terapéutica.

ZUSAMMENFASSUNG

Der Verfasser eroertert verschiedene Verletzungen und Erkrankungen des Auges vom Standpunkt des Allgeneinchirurgen, dessen Tilfe, wenn kein Augenarzt zur Hand ist, in Anspruch genommen werden mag. Zu diesen Erkrankungen gehoeren Fremdkoerper, Verbrennungen, Perforationen, Risse, Blutungen, Netzhautabloesung und verschiedene andere Zustaende. Es werden praktische Vorschlaege zur Behandlung vorgelegt.

RIASSUNTO

L'A. discute differenti ingiurie e malsttie del occhio dal punto di vista del chirurgo generale chi e' convocato ad operare nell'assenza d'un olftalmologista. Queste condizioni inchiudono corpi stranieri. ustioni, penetrazione, perforamento, lacerazione, emorragia, distaccamento retinale ed altre entita. Presenta suggestioni pratiche per terpia.

SUMÁRIO

O autor discute varios traumatismos e doenças dos olhos sob os pontos de vista do cirurgião geral que póde ser eventualmente obrigado a agir na falta de um oftalmologista. Estas condições incluem corpos extranhos, queimaduras, penetração, perfuração, laceração, hemorragia, descolamento de retina e varias outras entidades. Sugestões práticas de terapêutica são apresentadas.

RÉSUMÉ

L'auteur passe en revue les différents traumatismes et les lésions variées de l'oeil qu'un chirurgien général droit traiter, vu l'absence d'un ophtalmologiste. On rencontre alors les corps étrangers, les brûlures, la pénétration, la perforation, les lacérations, l'hemorragie, les décollements de la rétine et autres. On donne ici les conseils pratiques pour le traitement de ces lésions.

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Foreign Bodies in Hepatic Ducts

Review of the Literature

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THE occurrence of foreign bodies in the hepatic ducts, and especially in the common bile duct, is relatively rare, though Baumgartner and Lasky[1] have recently suggested that many such bodies remain undetected owing to the fact that they are capable of acting as nuclei for concretions and may therfore exist in the cores of isolated calculi. Whether or not the generally accepted rate of incidence is influenced by this factor, the subject in general is of peculiar interest to the surgeon. As recorded in the literature, such foreign bodies include sections of gauze, cotton threads, fragments of rubber tubing, needles, bristles, various suture materials, and fragments of wire or other metal, including hemostat blades, bullets and—at least in one recorded instance—the handle of a spoon! Small fruit pits are also observed occasionally.

Generally speaking, these objects gain admission to the body in three ways: (*1*) by indigestion, (*2*) by surgical accident or oversight, and (*3*) by access to a non-surgical wound. Their migration into the ducts is not completely understood. It remains, therefore, a matter of speculation; for, although logical and fairly convincing explanations have been offered in particular cases, there are other cases in which no explanation whatever can be found.

REVIEW OF LITERATURE

In 1926, Oppel[2] reported a case in which a surgical swab overlooked and left in a cholecystectomy wound migrated into the common duct, where it was discovered four months later. The patient had died of peritonitis. In the following year (1927) Lemierre and Pollet[3] added the case of an insane woman aged 50 who swallowed a spoon handle 13.5 cm. in length. The patient complained of a "stitch" in the lower part of the thorax and had a persistent, dry, unproductive cough. She was severely emaciated. An abscess of the liver was suspected, and surgical intervention was undertaken. Exploration revealed that the spoon handle, by this time considerably oxidized, had found its way into the common bile duct, extending thence to the liver. The patient died.

Three years later, in 1930, Fedoroff[4] reported the case of a patient operated on for the removal of gallstones. A T-tube was used for drainage, and on its removal (seventeen days after the operation) the horizontal bar broke off and remained buried in the wound. In spite of this fact the patient remained asymptomatic for two and one-half years. Attacks of colic and jaundice then occurred, abating and recurring sporadically over another two-year period. A second operation was performed. The tube was found, completely unaltered except for a coating of bilesand, in the retroduodenal portion of the common bile duct. The patient recovered.

Another case was reported in the same year by Goldman[5], whose patient, a man aged 36, had suffered a bullet wound fourteen years prior to the onset of the symptoms calling for investigation. Severe pain of unexplained origin, persisting for about a year, resulted in a decision to operate. A copper bullet covered with a gritty brownish precipitate was found in the cystic duct. In this case also the patient made a recovery.

Eichelter[6], in 1931, discovered cotton fibers in the common duct of a patient aged 39, apparently from a drain inserted during an operation performed fifteen

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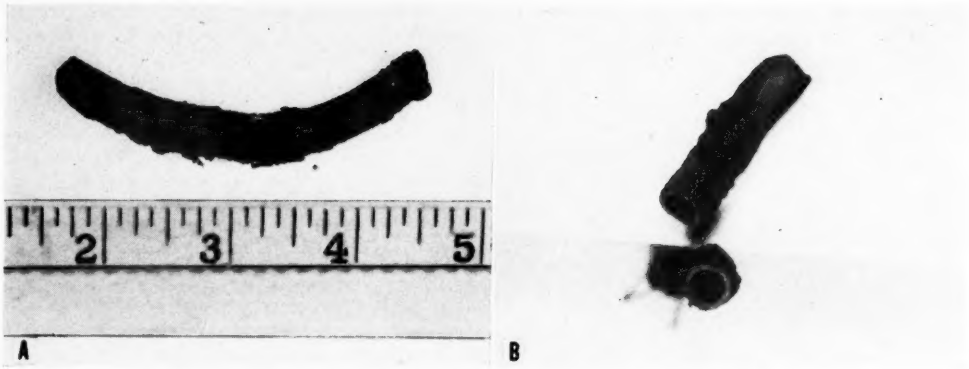

A, drainage tube removed from common duct after twenty-five years.
B, drainage tube in cross section.

months before. During the first part of this period no symtoms were observed, but eventually the patient showed signs of jaundice, with accompanying pain in the right upper abdominal quadrant. Two months after the onset of these symptoms a second operation was performed. The fibers, when found, were heavily encrusted. The patient recovered.

In 1932, Cooke[7] reported the case of a man aged 65, admitted to the hospital for indigestion, vomiting and pain under the right costal margin. Palpation revealed a swelling below the liver. Cholecystectomy was performed, and an L-shaped piece of wire was removed from the common duct, where it projected through the wall just below the end of the cystic duct. The patient, on recovery, was unable to explain the presence of the wire. He had undergone no previous operations. It is therefore probable that the wire was ingested.

Toland[8], in 1933, reviewed the literature and reported the case of a man aged 49, anemic and jaundiced, in whose common duct there was a lump of cotton gauze measuring approximately 1 by 1 cm. and heavily impregnated with bile salts and fibrin. Its presence dated from an operation performed four months earlier. The patient died.

In a case reported by Crawford and Stewart[9] in 1939, a woman aged 33 was admitted to the hospital for recurrent jaundice of seven years' duration, following cholecystectomy and appendectomy. The condition was painless, although the stools were clay-colored and some hemorrhage was noted. Surgical exploration revealed a hemostat blade 4.2 cm. long in the hepatic duct, coated with "dark green friable pigment concretions." The patient died. Neither operation nor autopsy revealed the manner in which the hemostat blade had migrated into the duct.

In 1940, Baumgartner and Lasky[1] described the case of a Negro youth aged 20, admitted to the hospital for nausea, vomiting and sharp pain in the right upper quadrant of the abdomen. Laparotomy revealed large amounts of stony material and a foreign body with a bulbous tip, which proved on examination to be a cherry stem, partly decomposed, The patient recovered. On being questioned, he agreed that the stem had probably been swallowed years before.

Bowen[10], in 1941, reported the case of a woman aged 42 who suffered from jaundice and biliary colic. Five years earlier she had been operated on for appendicitis and had made an apparently good recovery. The symptoms leading to her second hospitalization had been present for about a year. A 2-inch fragment of a No. 20F catheter, filled and covered with greenish calcareous deposits, was found in the common duct. It was removed, and the patient made an uneventful recovery.

The case here reported is remarkable

chiefly for the prolonged period during which the foreign body, a segment of rubber tubing, remained in the common bile duct.

REPORT OF CASE

Mrs. H. N., a Negress 68 years of age, was admitted to the hospital on March 23, 1949. She complained of discomfort in the epigastrium, disturbed digestion and constipation. A cholecystectomy had been performed about twenty-five years before.

Physical examination revealed that she was not acutely ill, but fully conscious, cooperative and mentally alert. There was marked epigastric tenderness, pronounced all over the gallbladder region, with a mass extending from 2 inches (5 cm.) above the umbilicus in the right upper quadrant to about the costal region; this mass was rather tender and uneven—almost nodular. The abdomen was soft but tympanitic.

The clinical impression was that of a malignant growth in the gallbladder or carcinoma of the stomach or pancreas.

The roentgen results follow: 1. The gallbladder could not be visualized radiologically, owing to cholecystectomy, obstruction of the cystic duct or chronic cholecystitis. 2. The gastrointestinal picture suggested an extrinsic pressure effect on the lesser curvature of the stomach. There was no evidence of intrinsic abnormality of the stomach or duodenum, but diverticula appeared in the descending colon and splenic flexure. 3. A barium enema showed diverticulosis of the hepatic flexure and descending colon and possible local irritation.

On April 4 the abdomen was explored. The stomach was found to be distorted by traction of adhesion to the gallbladder area and by pressure of an enlarged liver. The gallbladder was present. The hepatic, cystic and common bile ducts were markedly distended; the former two and the gallbladder appeared to be filled with "mud" and gravel; the common and hepatic ducts seemed to harbor stones.

When the common duct was opened, it was found to contain an old piece of rubber tubing about 3 inches long, "mud," and gravel. The tube was removed. A T-tube was placed in the common duct.

The patient's postoperative course was uneventful. A cholangiogram taken on April 19 revealed marked dilatation of the common bile duct but no evidence of obstruction of the biliary tract. The T-tube was removed on the twelfth postoperative day. The patient appeared in good condition on May 1.

COMMENT

Further interest, as well as considerable difficulty, is added to the study of this unpredictable condition by the fact that the clinical picture is far from clear. Symptoms that may indicate the presence of a foreign body or bodies in the hepatic ducts include abdominal pain (chiefly in the upper quadrants), nausea, vomiting, jaundice, emaciation and tumescence. Complications may result on a traumatic, an infective or a mechanical (obstructive) basis. It will be remembered that in the case reported by Lemierre and Pollet[3] there was a hepatic abscess, and that Oppel's patient died of peritonitis[2]. In the case described by Crawford and Stewart[9] there was hepatic insufficiency due to obstruction, with jaundice of seven years' duration and an internal biliary fistula.

Preoperatively the symptoms observed are characteristic of so many other pathologic conditions that it is difficult to arrive at a certainty as to the condition actually present. The occurrence of these symptoms, especially if several of them appear in combination, should suggest the advisability of thorough roentgen examination and, if necessary, exploratory laparotomy. Crawford and Stewart were able to make a preoperative diagnosis of foreign body on roentgen examination alone, but this is not always possible. In this connection, Bowen[10] expressed a firm objection to the use of rubber tubing in reconstruction of the biliary passages, on the ground that it is likely to be blocked by the deposition of bile salts. He recommended that new and well made tubing be invariably employed in such operations, and that it be tubing of a type that is visible in the roentgenogram.

SUMMARY

The occurrence of foreign bodies in the hepatic ducts, especially in the common bile duct, is examined from the etiopathologic point of view, and the literature is reviewed, with emphasis on the considerable variation of symptoms, sequelae and operative results. A case of the author's own, in which a foreign body was discovered in the common bile duct after twenty-five years, is reported in detail.

ZUSAMMENFASSUNG

Das Vorkommen von Fremdkoerpern in den Gallengaengen besonders im Ductus choledochus wird vom aetiologischpathologischen Standpunkt aus untersucht. Es wird ein Ueberblick ueber die Literatur gegeben und besonders die betraechtliche Wechselhaftigkeit der Symptome, der Folgezustaende und der chirurgischen Ergebnisse hervorgehoben. Ein eigener Fall des Verfassers, in dem ein Fremdkoerper im Choledochus nach fuenfundzwanzig Jahren entdeckt wurde, wird im einzelnen berichtet.

RESUMEN

Se examina etiopatológicamente la ocurrencia de cuerpos extraños en las vías hepáticas, especialmente en el colédoco. Se revisa la literatura señalando la considerable variación de síntomas, secuelas y resultados operatorios. Se da a conocer circunstanciadamente un caso del autor en que, después de veinticinco años, se descubrió un cuerpo extraño en el colédoco.

RIASSUNTO

Esamina dal punto di vista ezio-patalogico l'occorrenza di corpi estranei nei dotti epatici; specialmente nel coledoco; e passa in rassegna la letteratura, con enfasi sulla variazione importante dei sintomi, sequele e risultati operativi. Un caso del'A. in cui scoprì un corpo estraneo nel coledoco dopo venticinque anni viene riportato in dettaglio.

SUMÁRIO

A ocôrrencia de corpos extranhos nos canais hepáticos, especialmente no colédoco, é examinada sob o ponto de vista etiológico e a literatura é revista, com realce da consideravel variação de sintomas, sequélas e resultados operatórios. Descreve-se com detalhes um caso próprio do autôr, no qual um côrpo extranho foi descoberto no colédoco depois de vinte e cinco anos.

RÉSUMÉ

L'auteur étudie la fréquence des corps étrangers dans les canaux hépatiques, particulièrement dans le cholédoque, et leur étiologie; il passe aussi en revue toute la littérature sur ce sujet, en appuyant surtout sur la variété des signes cliniques, les séquelles et les résultats post-opératoires.

L'auteur décrit en détail un cas personnel qui présentait un corps étranger du cholédoque depuis 25 ans.

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Eosinophilic Variations After Irradiation of the Adrenal Glands

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BEFORE 1948 there was no direct experimental means to test the influence of the hypophysis and the adrenal cortex upon the number of circulating eosinophils. In 1939 Dalton and Selye observed a decrease in the number of eosinophils in the rat, produced by certain "alarm" stimuli.[1] Some time later Selye included this phenomenon in his general adaptation theory.[2] It was not until 1948 that Hills, Forsham and Finch demonstrated that ACTH and compound F of Wintersteiner produce a decrease in the number of eosinophils[3]; this has been corroborated by other investigators, Herbert and De Vries, Elkinton, Hunt, Godfrey, McCrory, Rogerson and Stokes.[4] In 1948 Forsham, Thorn, Prunty and Hills added a report of decrease in the number of eosinophils after the administration of ACTH as a test to determine adrenal function.[5]

Knowing that after irradiation of the adrenal glands there is a variation in the number of lymphocytes in man, variation in which may be due to modification processes in the quantity of glandular secretion,[6] we have recorded the number of circulating eosinophils after irradiation with the purpose of obtaining a test of the presence and function of each adrenal gland separately, as the test performed by Forsham, Thorn, Prunty and Hills gives a result which includes the function of both adrenal glands. The possibility of determining the functional state of each gland separately is of great clinical and surgical importance.

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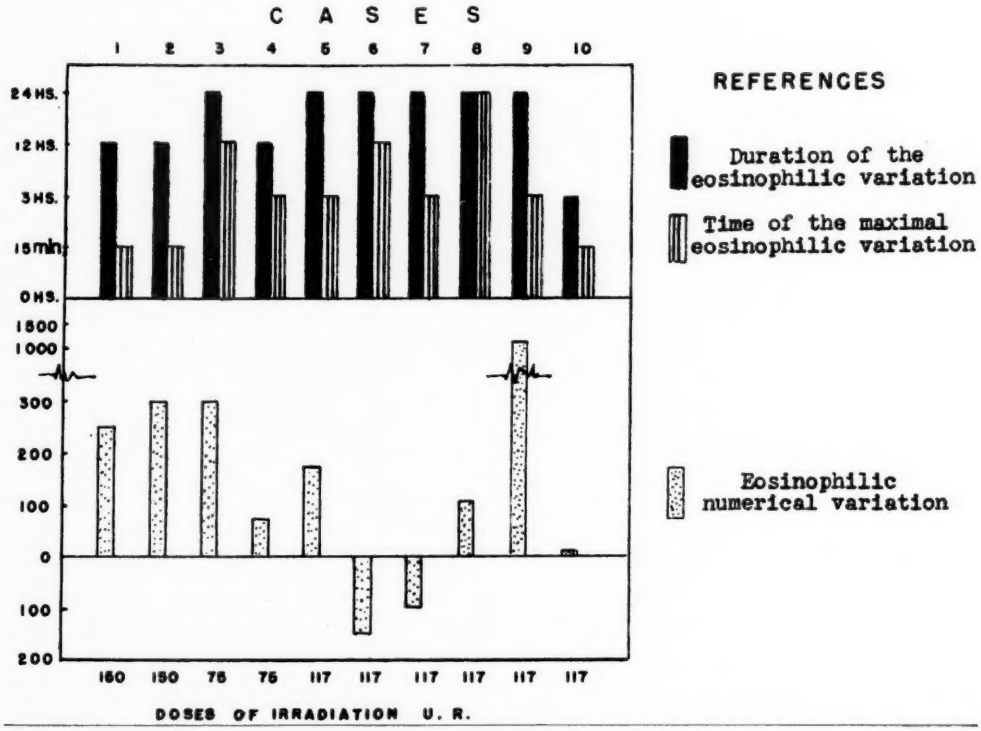
Previous Work.—Little is known about the function of the eosinophils and the mechanisms by which variations in their number are produced. In 1950 Hench came to the conclusion that, though much has been done in the field of research, little is known about the mechanisms by which these hormones act.[7] Nevertheless, it has been observed clinically that there is a relation of both elements, eosinophils and corticotropic, hypophysial and corticoadrenal hormones: in Cushing's syndrome, in which the ketosteroids are as a rule increased (Venning[8]) there is eosinopenia (Levine and Weisberg[9]); in adrenal insufficiency, in which the ketosteroids are diminished (Venning[8]) there is eosinophilia (Lewis[10]; Thorn and Forsham[11]). Nevertheless, such a relation in the variation of the number of eosinophils is not absolute, since the ketosteroids represent the products of degradation of the androgenic adrenal hormones and those of testosterone (Wilhelm[12]). In the adrenogenital syndrome, in which the ketosteroids are greatly increased (Venning, 1950[8]) there is no eosinopenia (Thorn and Forsham[11]). One must bear in mind also that such clinical relations of hyperfunction of the adrenal cortex-eosinopenia and hypofunction-eosinophilia are proved in the experimental test of clinical importance developed by Forsham, Thorn, Prunty and Hills, who were able to obtain evidence of such a relation.[5]

With respect to the relation of eosinophils and epinephrine or adrenal medulla, Speirs and Meyer[13] observed that this substance produces eosinophilia in adrenalectomized animals and eosinopenia in normal and hypophysectomized animals. This has been attributed to the fact that epinephrine determines increase in the

Method Used in Irradiation Studies

Group	Case Nos.	Kilovolts	Milliamperes	Distance, Cm.	Filtration	Time, Minutes	Dose, Roentgens
A	1 and 2	180	5	50	0.5 mm. Cu, 1 mm. Al	5	150
B	3 and 4	180	5	25	0.5 mm. Cu, 1 mm. Al	5	75
C	5, 6, 7 and 8	130	10	50	3 mm. Al	5	117
D	9 and 10	130	10	50	3 mm. Al	3	117

adrenal oxicorticosteroids, which in turn produce eosinopenia; the spleen does not take part in the eosinophilic depression induced by epinephrine (Drury[14]). Vogt observed that with the infusion of epinephrine the adrenal cortex increases the amount of secretion,[15] the same effect produced by splanchnic stimulation.[16] In 1947 Long reported that epinephrine produces an increase in utilization of the cortical hormones by the tissues, or changes the hematic composition, increasing the amount of corticotropic secretion.[17] Epinephrine also produces a decrease in ascorbic acid and cholesterol.[18] Finally, Almy and Laragh,[19] Godlowski[20] and Hortling and Pekkarinen[21] reported that in man the administration of epinephrine



produced eosinopenia. This is determined partly by the action exerted upon the adrenal cortex, increasing its secretion directly or through the hypophysis.[22] It may be concluded, then, that the increase in the amount of epinephrine produces eosinopenia through hypophysial and adrenal activities.

EXPERIMENTAL METHOD

Ten observations were made after adrenal irradiation in 5 normal adults. The number of circulating eosinophils per cubic millimeter of blood was recorded before irradiation and fifteen minutes, three hours, twelve hours and twenty-four hours after irradiation. The dosage and characteristics of the irradiation were determined by Dr. Manuel F. Madrazo in accordance with the various experiments and successive observations. The groups were treated as shown in the accompanying table.

RESULTS

In the 10 cases of our experiment a variation in the number of circulating eosinophils was observed; in 8 of them an increase occurred, and in 2 there was a decrease. The point of maximal intensity in variation was the one corresponding to three hours after irradiation in 4 cases, in the one corresponding to fifteen minutes in 3 cases, in that of twelve hours in 2 cases, in that of twenty-four hours in the remaining case. As for the numerical variation, the increase in the number of circulating eosinophils was 12 minimum and 1,173 maximum in relation to the number recorded before irradiation (initial reading). The decrease in the number of eosinophils was 156 in one case and 96 in the other.

Neither the increase nor the decrease in the number of circulating eosinophils showed a relation in its character or intensity to the variations in the stimulus; in 2 cases, with the same stimulus, there was an increase in the number of eosinophils in one of the adrenal glands and a decrease in the contralateral gland (Cases 5 and 6 and Cases 7 and 8).

COMMENT

From our observations it may be concluded that the most striking variation, owing to its frequency, is the increase in the number of eosinophils; with the exception of Case 10, in which there was only a slight variation, it can be deduced that irradiation was responsible for the variation in the number of eosinophils. However, it is not possible to say which of the two components of the adrenal gland (cortex or medulla) is responsible for the type of response observed, since both are irradiated.

The increase in the number of eosinophils after adrenal irradiation may be due to: (1) inhibition of corticoadrenal secretion, since the states in which there is a decrease in the amount of secretion are accompanied by eosinophilia; (2) inhibition of medullary secretion with normal adrenocortical secretion, as in man under basal conditions the secretion of epinephrine seems to be continual,* or (3) stimulation of the adrenal medulla, with a deficient corticoadrenal function as reported by Speirs and Meyer,[13] who noted that epinephrine produces eosinophilia in the absence of adrenal cortex.

The first two factors are correlated. Nevertheless, we conclude that, as epinephrine is only one of the several substances that stimulate cortical secretion, this factor in itself would not explain the intensity of the eosinophilia recorded. We believe it more important to consider that the increase in the number of eosinophils is due to inhibition of corticoadrenal secretion. We have overestimated medullary stimulation in the past (Manzanilla and Manzanilla, 1950[6]); our present experiments indicate that it does not have such an importance, since clinically it has not been possible to obtain, among the adrenal insufficiencies observed, a case similar to

*This is based on our former observations[23] after adrenal denervation, glycemia being used as a biological reactor, stressing the fact that epinephrine stimulates corticoadrenal secretion in several ways.

the experimental one reported by Speirs and Meyer.

Consequently we believe, on the basis of previous data, that the increase in the number of eosinophils produced in man after adrenal irradiation is due mainly to an inhibition of corticoadrenal secretion, though it is not possible to discard the role played by inhibition of medullary secretion.

As for the decrease in the number of eosinophils, it may be due to: (1) stimulation of the adrenal cortex or (2) increased epinephrine secretion, which in turn would increase cortical secretion. We are inclined to believe that both mechanisms participate, as per data obtained with other biological reagents.

The fact that neither type of variation, increase or decrease, showed a relation to the character and intensity of the stimulus, and that both were obsered in one subject for whom a stimulus having the same characteristics was used, indicates that the eosinophilic variations produced after roentgen irradiation of the adrenal glands are in relation with the state of each of the glands.

CONCLUSIONS

1. The adrenal glands determine, in man, variations in the number of eosinophils after being stimulated by roentgen rays.

2. Such a variation consists mainly in an *increase* in the number of eosinophils. This is attributed, by experimental and clinical analogy, to cortical inhibition.

3. There is also a *decrease* in the number of eosinophils, though this response is in much less proportion than the former, which may be attributed to stimulation of the cortex and medulla.

4. There does not seem to be a relation between the characteristics of the stimulus and the type of response obtained, at least with the type of stimulus we used in our experiments.

5. The adrenal glands in the same subject may elicit different responses when the same stimulus is used with roentgen rays.

6. Determination of the eosinophilic variations, lymphocytic variations and modifications in the hematic cells and blood chemistry after irradiation may be of great help in establishing the existence and function of the adrenal glands in certain conditions of clinical and surgical importance, and also in verifying an indication for irradiation in certain diseases of the adrenal glands—especially when total monolateral adrenalectomy is indicated, not so much to disclose the congenital absence of the contralateral gland as to disclose possible insufficiencies, since the indication for adrenalectomy must presuppose the presence and sufficiency of the contralateral gland.[24]

SUMMARY

A study is made of the variations in the number of eosinophils produced after roentgen irradiation of the adrenal glands, with special reference to one of the several aspects in the field of investigation, in an effort to identify certain phenomena related to the presence and functions of the adrenals. A method is presented which may prove to be a valuable aid in certain conditions of clinical and surgical importance.

RESUMEN

Se estudian las variaciones eosinófilas por irradiación suprarrenal con rayon röntgen, en uno de los aspectos de investigación sobre el particular, con fines a la identificación de fenómenos relacionados con la presencia y función suprarrenal, de posible utilidad en determinadas condiciones de importancia clínica y quirúrgica.

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A Matter of Opinion

Good opinion is not flabby and uncertain. It is not a "much to be said on both sides." It is a provisional conviction to be held as a conviction until new light alters it. It is an interpretation with a definite slant and bias. But it presses hotly for proof. It strains constantly toward the accuracy of truth. Good opinion, although firm, is the direct opposite of dogma. Dogma is hard and unyielding, a sort of petrified emotion. It is constantly masquerading as proof, as genuine opinion never does. You do not revise dogmas. You smash them. But opinion is flexible and gracious. It does not object to examining itself, to publishing the source of its interpretations. It takes you freely behind the scenes. It is not afraid to show you the foundations of the categories and terms in which it is expressed. It will let the bony framework of its presuppositions stand out rather boldly at times. It invites criticism. It has the scientist's disinterestedness in its own conviction. What it wants is to understand, to get the thing it is judging rightly placed, to grasp its true meaning in the world.

Opinion, however, aims not at a mere static comprehension. It does not merely survey the field with serene Olympian gaze. It is a force, and the only force that can be relied upon in the long run to fortify the will and clear the vision. Conviction, gripped after the widest possible survey of the field, is what we must act upon if we are to effect those social changes which most of us desire. The world has generally preferred to act from logical consistency or from the high elation of feeling rather than upon daring and clear-sighted experiment. The idea of a social and political opinion which, free from moral prejudice, strains toward scientific proof, as the hypotheses of the physicist strain toward physical laws, is still very new, but it is already playing havoc with the old crusted folkways.

—*J. Randolph Bourne*

Berylliosis and Silicosis

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SINCE World War II, the hazard of beryllium poisoning has become well known in industry. Prior to that time there were sporadic cases cited in the European literature. Gelman[1] and others reported a number of cases of beryllium poisoning in workers from beryl ore mines in the Ural Mountains. In his report to the League of Nations, he described all the phases and variants of the disease as it is now known in the United States. Even the neighborhood cases were correctly described by him. If there were any cases in the United States prior to World War II, they were not recognized. One such case, observed in New Jersey, was cited by Martland[2] in his paper on "Occupational Beryllium Poisoning in New Jersey".** In that report, Martland included a case brought to him as Chief Medical Examiner of Essex County by R. Pomeranz.[3] That case had been reported by Pomeranz as "nickel poisoning and productive miliary tuberculosis". Further studies by Gardner and Martland and the history of exposure to beryllium finally established this as a case of berylliosis. It was the first reported case of beryllium poisoning in New Jersey before World War II. Additional patients with berylliosis contracted before World War II and treated for many years with the diagnosis of chronic tuberculosis came to autopsy last year and will be reported later.

Because of the excellent metallurgic properties of beryllium, it was used extensively in industry during World War II. The need for atomic research, plus the fact that beryllium is an excellent source of neutrons, has established this metal as a permanent industrial hazard. Since World War II, experimental work on animals and clinical reports of the condition in human beings have multiplied to such an extent that one can mention only the most important facts as to toxicity.

Beryllium is an element with the atomic weight of 9 and the atomic number 4. Of the four known isotopes, Be^7 is the most useful. Be^7, with a half life of forty-three days, is destined to play a greater role in future research as a tracer. It can be used in experimental animals in the study of histopathology and in final determination of the minimal tissue dose toxicity. Beryllium is used chiefly in the form of compounds, particularly beryllium oxide, zinc beryllium silicate, and phosphor powders containing beryllium for fluorescent lights and copper alloys, and also as alloys with other metals for manufacture of fine wires and filaments. As a result of the greater use of the metal, a number of plants are producing beryllium from beryl ore. In the vicinity of one of these plants a number of neighborhood cases had developed; the patients were nonworkers who were exposed to air polluted with beryllium fumes within a radius of 4,000 feet. One case was reported two miles away from the plant—a worker's wife had contracted berylliosis by cleaning and washing her husband's overalls. This series of important cases was reported by Eisenbud and his associates.[4] They were able to establish the minimal atmospheric pollution necessary for development of the disease to be about 0.1 microgram of beryllium per cubic meter, and suggested 0.01 microgram as a permissible atmospheric pollution. In their experience no cases of berylliosis have developed in the vicinity of the plant where the atmospheric pollution was found to be 0.001 microgram of beryllium or less. They have also shown experimentally that by cleaning the overalls, one can inhale 17 micrograms of beryllium per

*Consultant, New Jersey State Labor Department.
**We are indebted to H. S. Martland, M.D., Chief Medical Examiner of Essex County, Newark, N. J., for permission to use autopsy records in this case.
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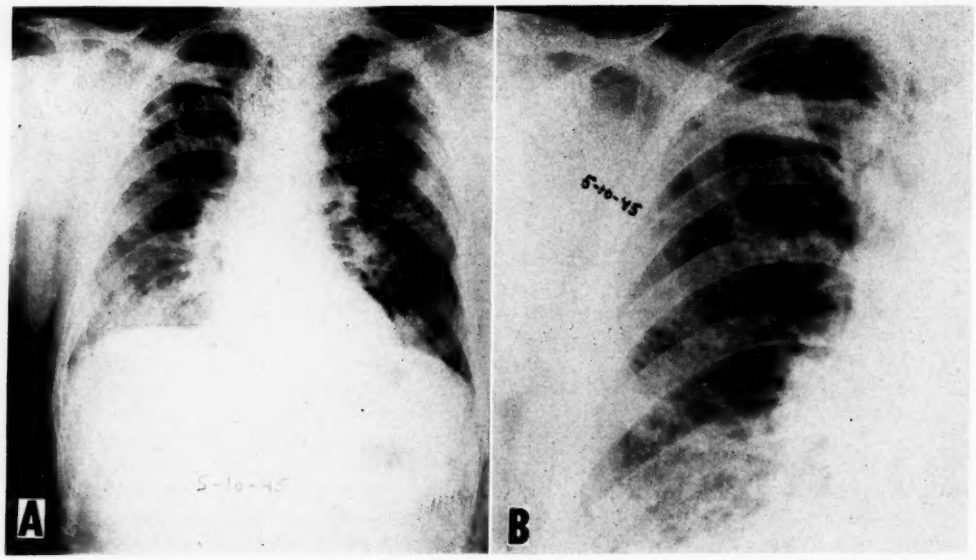

Fig. 1.—*A*, Film taken in 1945. Note generalized nodular and interstitial fibrosis obliterating the normal vascular lung pattern. The left ventricle is prominent. *B*, enlarged detail of right lung.

day during home laundering. This gives some indication of the toxicity of the metal. Stockinger[5] considers beryllium highly toxic to the tissues, one thousand times more toxic than radium.

Next in importance is the particle size. Beryllium is generally inhaled in the form of fumes and very fine particles. Toxicity is in direct proportion to the number of particles retained in the tissues. Particles below a micron in size are the most dangerous and therefore the most important. Newly contrived measuring devices and dust-sampling technics permit the measuring of particles from 0.1 to 0.01 micron. In addition, the surface area of the particles and geometric surface, solubility, electric charges and other still unknown factors are as determinants in the toxicity of beryllium. Further intensive research on animals and measurements on the particulates will be of great help in the etiologic determination of the disease.

In the human being, certain conditions such as pregnancy and fatigue will produce increased susceptibility to the disease. Certain chemical and metabolic changes may, to some degree, explain the increased susceptibility. These factors account in part for the spotty incidence of the disease. The final answer to these problems is still not available. The proper localization of the particles in the tissues is still unknown, as is the extent of tissue reaction to beryllium when it is mixed with other toxic agents such as silicon, nickel and other unknowns. It is well known that the pulmonary fibrosis associated with silicosis is a result of nature's defense reaction to deposition of the silica particles in the interstitial lung tissues. We are assuming that the same mechanism applies to particulates of beryllium taken up by the cells of the reticuloendothelial system. Attempts have been made to treat patients in the early stages of pulmonary granulomatosis due to beryllium with ACTH or cortisone, apparently with good results. Recently several investigators have considered tissue reaction to particles of beryllium an allergic problem, stating that persons who have some type of allergy are also hypersensitive to beryllium salts. In these workers beryllium

dermatitis develops early. Skin ulcers or granulomas resulting from intradermal incrustation of beryllium particles from broken fluorescent lamps or by direct contact will not heal unless excised in toto.

The best hope for a definite diagnosis of berylliosis during life is surgical lung biopsy which may be indicated in doubtful cases. One of us (H. A. Brodkin), a thoracic surgeon, believes this procedure is feasible and represents no undue risk to the patient. To our collection of cases proved toxicologically and microscopically, we are adding a case of proved berylliosis and silicosis.

REPORT OF CASE

A man aged 66 had been an experimental chemical engineer since 1917. He worked on television, on neon lights and (from 1939 to 1942) in fluorescent laboratories on gas conduction tubes. He was making tests on phosphorescent and silicate powders. His job was to devise a mechanical method to clean rejected tubes with a dry cloth on spinning shafts. On this job the exposure to dust was very severe.

The family history and past history were noncontributory. There was no history of tuberculosis in the family, and the patient had had no serious illness (except for an occasional infection of the upper part of the respiratory tract) up to the present illness.

He first noticed slight dyspnea in 1941. Walking upstairs became difficult. He lost the power of lifting. Symptoms were gradually progressive and became well marked by September, 1944. In 1945 he could walk only a block on level ground. A productive cough began to occur in the morning; there was never any hemoptysis. He lost 15 pounds (6.8 Kg.) between 1942 and 1945. He had no pain and no ankle edema. His heart was not enlarged, and there were no murmurs; the cardiac sounds were good. The lungs were resonant. Crackling rales were heard over both bases. There was no clubbing and no cyanosis. Dyspnea was progressive, so that by 1949 he spoke slowly and with great effort. He died on March 4, 1949.

Roentgen Data.—We had at our disposal only two films, one taken in 1945 and the other in January 1949.

The 1945 films (Fig. 1) presented the following picture: The thorax was asymmetric owing to moderate kyphosis of the dorsal portion of the spine. The heart showed a promi-

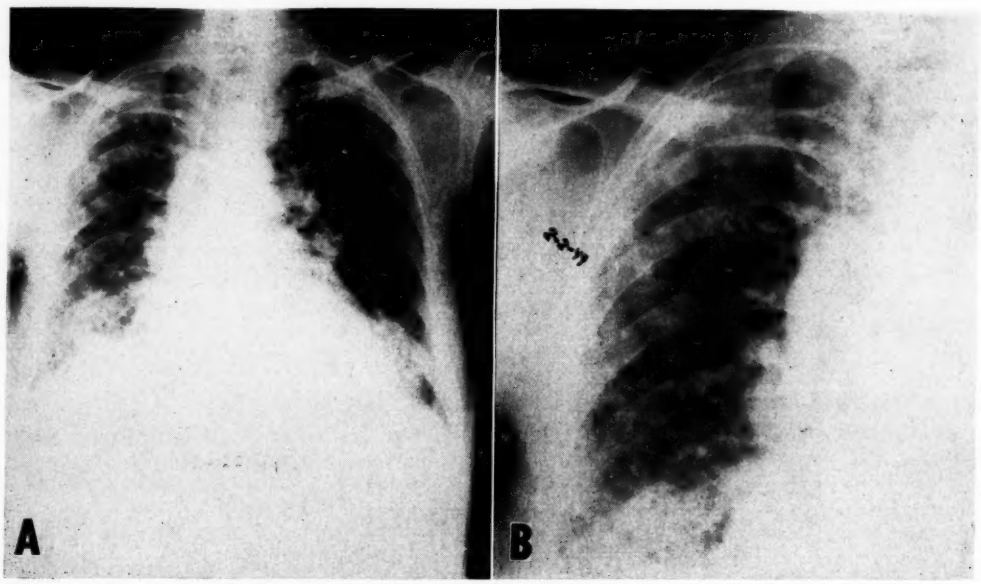

Fig. 2.—*A*, Film taken in 1949. Note definite cardiac enlargement, cor pulmonale, and progressive interstitial and nodular fibrosis. *B*, Enlarged detail of right lung.

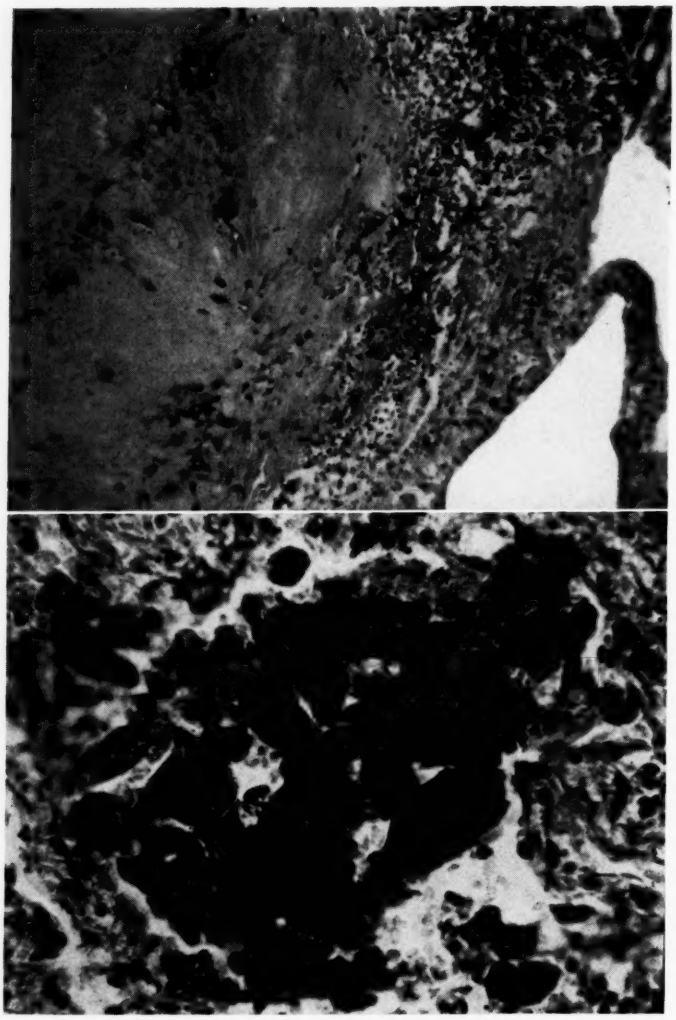

Fig. 3—*Top*, Large hyalinized silicotic nodule, × 100. *Bottom*, Conchoidal bodies within a large giant cell, stained blue. × 450.

nent left ventricle. The aorta was moderately dense and of normal width. The trachea was slightly pulled over to the right. Both lungs showed dense hilar shadows, a markedly increased vascular pattern bilaterally, and obliteration of the normal vascular pattern in the midzones by numerous coalescing nodules. These nodules were seen in all parts of the lungs, but apparently more on the right. They obliterated the trunk shadows at both bases medially.

The 1949 films (Fig. 2) showed definite enlargement of the cardiac silhouette as compared with that observed on previous study. There was marked increase in the nodules, and interstitial changes were noted throughout both lungs and both bases. The hilar shadows were more dense. The nodules were

very dense, and some of them were fairly sharp; others had variable borders and shapes. No cavities were seen. The cardiohilar spaces were obliterated.

The case was referred for autopsy to Dr. Martland as Chief Medical Examiner.

Autopsy.—The body presented a well developed muscular frame, poorly nourished, with slight clubbing of fingers and toes and a large inguinal hernia. The abdominal cavity contained 1 quart of clear straw-colored fluid; there was no evidence of bowel obstruction. The heart measured 12 by 14 by 9 cm. and weighed 500 Gm. The heart was broadened. The right ventricle was of good consistency, measured 0.5 cm. and showed no evidence of fibrosis or hemorrhage. All valves were free. The aorta showed slight atheroma and measured 2.5 cm.

Lungs.—The left lung weighed 775 Gm. The tissue was dark reddish gray, cut with difficulty and showed diffuse nodulations and fibrosis throughout the entire parenchyma. There were no cavities. The nodules measured about 0.5 cm. in diameter. There were no cavities. The nodules measured about 0.5 cm. in diameter. There were numerous emphysematous bullae along the edge of the lungs. The bronchi were dry; the mucosa was congested, and the hilar nodes were enlarged. The right lung was the same as the left. There were dense pleural adhesions near the right apex.

TABLE 1.—*Toxicologic Observations (F. Dutra)*

	Weight, Gm.	Micrograms of Beryllium in sample	Micrograms of Beryllium in 100 Gm.
Liver	20	1.14	5.7
Kidney	25.6	0.69	2.7
Lung	23.6	2.0	8.5
Lymph nodes, hilar	5.5	2.3	41.8

TABLE 2.—*Toxicologic Observations (J. B. Brady)*

Beryllium found		
Liver	2.9	gamma
Kidney	2.6	gamma
Spleen	1.1	gamma
Lung (in formaldehyde)	9.1	gamma
Silica found		
Lung in formaldehyde	100	Gm.
Sample taken		
Air dried	30	Gm.
Ash	5.8	Gm.
Acid insoluble	45.76%	
Silica	38.36%	
Per cent of silica in dry lung	7.38	
Per cent of ash in dry lung	19.3	

Other Organs. — The spleen weighed 185 Gm. and showed a firm pulp. The kidneys had a granular surface. The liver weighed 1,500 Gm. and showed rounded edges; the capsule was smooth except for diffuse granulations; its tissue cut with considerable resistance. The gallbladder was thickened and fibrous and showed about 30 faceted stones. The brain substance showed diffuse edema. There were no hemorrhages or tumors. The spinal fluid was increased in amount. The basal vessels were moderately calcified.

Microscopic Observations (Fig. 3). —The entire lung showed extensive interstitial fibrosis with numerous nodules, so that very little aerated tissue remained. The nodules were fairly large, composed of many smaller ones, and were hyalinized. The remaining alveoli showed in some places emphysema and in other places edema; the nodules and the interstitial septums contained a great deal of anthracotic and blood pigment. In many places one could see conchoidal bodies which were stained blue. Giant cells of the Langhans type were visible throughout the lungs. The liver showed passive congestion and occasional granuloma.

Toxicologic Observations.—The toxicologic picture is summarized in Tables 1 and 2. This analysis indicates a silicotic lung. The proportion of mineral solids is far beyond that of any specimen ever handled in the same manner in this laboratory before.

COMMENT

Review of the roentgen data failed to disclose any definite evidence of the characteristic snowstorm appearance associated with chronic beryllium poisoning. The nodules varied in size and shape and no definite etiologic conclusions could be drawn from their appearance. Also worthy of note was the definite progression of the disease between the two examinations, both in the lungs and in the size and shape of the heart. Toxicologically, the glands contained most of the beryllium and the lungs contained ten times the normal amount of silica. It seems that exposure to silica was more pronounced than to beryllium. For a complete diagnosis, correlation with the occupational history is of paramount importance.

SUMMARY

1. A case of beryllium poisoning combined with silicosis, proved microscopically and toxicologically, is presented.

2. No etiologic conclusion could be drawn from the roentgenogram per se. Complete correlation of all observations is necessary for a definite etiologic diagnosis.

ZUSAMMENFASSUNG

1. Ein mikroskopisch bestaetigter mit Silikose kombinierter Fall von Berylliumvergiftung wird beschrieben.

2. Das Roentgenbild als solches gestattete keine Schluesseauf die Krankheitsursache. Zur Stellung einer endgueltigen ursaechlichen Diagnose ist es notwendig, alle vorhandenen Daten in wechselseitige Beziehung zu bringen.

RESUMEN

1. Se presents un caso de envenenamiento por berilo combinado con silicosis, comprobado microscópica y toxicológicamente.

2. Ninguna conclusión etiológica puede derivarse del röntgenograma por sí mismo. Se necesita la correlación completa de todos los datos para un diagnóstico etiológico cierto.

RIASSUNTO

1. Un caso d'avvelenamento con berrillio (beryllium) in associazione con silicosi, provato microscopicalmente e tossicologicalmente e' presentato.

2. Conclusione etiologica non si poteva cagionare dal roentgenogrammo per se. Correlazione completa di tutto tema e' necessario per la diagnosi etiologica definitiva.

RÉSUMÉ

On presente un cas d'empoisonnement au Beryllium associe à la silicose; la preuve a été faite par l'examen mocroscopique et toxicologique.

SUMÁRIO

1. Um caso de envenenamento pelo berilo combinado com silicóse, provado pelo exame microscopico e toxicologico, é apresentado.

2. Nenhuma conclusão etiologica pôde ser obtida pelo exame radiológico. Compléta inter-relação de todas as observações é necessaria para um diagnóstico etiológico definido.

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Bad times have a scientific value. These are occasions a good learner would not miss. —Emerson

The times are not as bad as they seem. They couldn't be.

—Jay Franklin

Retropubic Prostatectomy

A Modification of the Millin Operative Technic (1945)

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THE object of this paper is to demonstrate a method of prostatectomy which I have found of excellent value in general surgical practice.

The Millin operation appealed to me because of its ease of approach. I found, however, that certain features of this procedure gave me trouble, namely, the transverse capsular incision and the problem of hemorrhage.

The Transverse Incision on the Capsule.—1. If the gland was small and fibrous, dissection was naturally more difficult. With this increased difficulty during the dissection, I found that there was a great tendency for the incision to tear laterally, often to such an extent that the bladder was at times almost completely severed from the prostatic capsule. 2. If the gland was unusually large, its extraction from its bed would often result in lateral tearing of the incision. 3. Exploration of the interior of the bladder or dealing with vesical pathologic conditions was difficult through the transverse capsular incision.

Hemorrhage.—1. The veins of the prostatic plexus ascend in the prostatic capsule, and as they approach the sphincteric ring they curve toward the lateral angles. The high transverse incision in the capsule would sever the veins, which bleed freely, The special T capsule forceps of Millin was helpful in controlling the bleeding, but would get in the way. 2. The arterial blood supply to the gland is largely concentrated at its base, in the posterolateral angles. With the transverse incision I found it difficult at times to pick up these vessels in a forceps for ligature with needle and catgut. When difficulty arose I would use the Bovie to fulgurate the vessels. On several occasions, when this was done, I encountered severe secondary hemorrhage.

These difficulties led me to a gradual modification of the Millin technic. It is this modification that I should like to demonstrate.

This paper is based upon a series of 53 consecutive prostatectomies, performed during the last two and one-half years. A follow-up of these cases has not been difficult, as I practice in a relatively small community, am closely associated with my patients and soon hear if anything goes wrong.

Age Incidence.—One patient was between 40 and 49 years of age; 6 were between 50 and 59; 20 were between 60 and 69; 23 were between 70 and 79, and 3 were between 80 and 89.

Type of Gland, Based on Pathologic Report.—The following pathologic conditions of the gland were observed: Malignant disease (diagnosed preoperatively), 1 case; benign hypertrophy with adenocarcinoma, 4 cases; chronic prostatitis, 1 case; chronic prostatitis with abscess formation, 2 cases; chronic prostatitis with calculi, 6 cases; benign hypertrophy, 39 cases.

Size of Gland.—The glands were of all sizes, ranging from 12 to 110 Gm.

Previous Operations on the Gland.—In 6 cases transurethral resection had been previously performed.

Two-Stage Operation.—In 3 cases the operation required two stages. In Case 1 the patient was admitted in coma with overflow retention. In Case 2 the patient fractured his hip on the eve of operation. The hip was pinned the following morning, with suprapubic drainage. In Case 3 the patient was admitted with acute re-

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tention. An abdominoperineal resection for carcinoma of the rectum had been performed eight years earlier.

In all 3 cases the gland was removed within two weeks, at which time the fistulous tract was excised and the bladder closed before prostatectomy was performed.

Stay in Hospital.—Fifty-three patients spent 968 postoperative days in the hospital, or an average of eighteen and three-tenths days each. This included a stay of forty-two days by the patient with the hip fracture; a stay of forty-six days by the patient in Case 1 of the two-stage operations; and respective stays of forty-six and forty-three days by 2 men over the age of 80, who were unable to have care at home. Most of the men in the younger age brackets left between the eighth and the twelfth postoperative day.

Mortality Rate.—There were 2 deaths in the series, a mortality rate of 3.8 per cent. The first patient, a man aged 58, died on the twelfth postoperative day from pulmonary embolism. He had cardiac disease and was kept in bed ten days after the operation because of this. The second patient, aged 80, died suddenly on the twenty-fifth postoperative day from acute coronary disease. He was up and about and doing well at the time. He had been kept in the hospital for lack of home care.

Postoperative Complications and Sequelae.—The following complications were noted:

Acute epididymitis, 1 case. The patient objected to ligation of the vas.

Pulmonary atelectasis, 1 case. The patient, aged 77, was hospitalized for forty-three days after operation.

Urethrorectal fistula, 1 case. This was the case of frank malignant disease. The gland and capsule were removed by the Millin technic. The fistula closed spontaneously. The postoperative hospital stay was thirty days. The patient lived eighteen months. There was no local recurrence or stricture formation.

Urethral stricture, 1 case. This was the only known case of urethral stricture. The patient had benign hypertrophy with associated adenocarcinoma. The stricture occurred fourteen months after the operation. Recent resection of the obstructing tissue in the prostatic bed with the Thompson resectoscope showed it to be malignant.

Acute thrombophlebitis, 2 cases. In 1 case this occurred on the seventeenth day and in the other on the nineteenth.

Acute retention, 1 case. Four weeks after the operation there developed acute retention of urine, requiring catheterization. Marked pyuria was present, which cleared rapidly on administration of sulfa drugs.

Stone formation, 2 cases. Both patients had pain and frequency. In the first case the complication occurred eight weeks after the operation, with several small stones in the prostatic cavity. In the second it occurred twelve weeks after the operation, with a small stone in the bladder. Both patients were relieved when the stones were removed per urethra.

Retained oxycel, 1 case. This patient, after the operation, had bouts of pain and frequency with chronic pyuria. He would permit no investigation for nine months, after which time a large piece of oxycel was found in the prostatic cavity. It required removal through the bladder.

Dribbling of urine, 3 cases. For varying periods up to four weeks, 3 patients complained of dribbling of urine when they were upset or under strain, as in crowds, conducting business, coping with family discords, etc. When quiet, they had complete control. They had two things in common; their ages ranged from 75 to 80, and they were all of nervous temperament.

The diagnosis of prostatic obstruction and the indications for surgical intervention are not within the scope of this paper. However, once a diagnosis is made and relief indicated, the patient is prepared for operation. This preparation consists largely in assessing the patient's condition; combating anemia, dehydration, and starvation, and using an indwelling catheter if the bladder retention is marked and the obstruction not complete. Pro-

thrombin levels are studied and blood made ready. In my experience, while the hazards of surgical treatment increase with age, the aged withstand it well provided they are not allowed to develop shock. The reversal of shock is much more difficult and hazardous in the aged, and the balance is easily tipped by excessive use of intravenous fluids, the tendency to pulmonary complications, the dangers of barbiturate sedation, etc. The less these patients are restrained, the better. Early ambulation, encouraging them to eat and drink, and the use of mild sedatives, such as aspirin, empirin compounds, bromides, and morphia in moderate doses, are important in the after-care of these patients.

Preoperative Sedation and Anesthesia.—Demerol 1½ cc. with atropine gr. 1/200 has been the usual preoperative sedative medication. Light nupercaine spinal anesthesia up to about the eighth thoracic level, with light narcosis by nitrous oxide and oxygen, supplemented with small doses of pentothal given intravenously, have been the anesthetic agents of choice.

Operative Technic.—After the patient is anesthetized a catheter is passed, emptying the bladder. The catheter is then removed. The patient is now placed in the Trendelenburg position, and the skin of the abdomen, penis and scrotum is prepared in the usual manner. Skin drapes are placed in such a manner as to leave the penis accessible between towels.

The cutaneous incision is low and transverse, at the pubic hair line. It curves slightly to just beyond the outer edges of the recti, the combined tendinous fibers of the recti are next divided in the line of the cutaneous incision and laterally to the recti; the combined tendinous fibers of the external oblique, the internal oblique and the transversus abdominis muscles, which form the anterior sheath of the recti, are further divided for about 1 inch (2.5 cm.).

The vas deferens is now picked up in either angle of the incision. It is then crushed, divided and ligated. To do this, the rectus muscle is retracted medially, and the line of the inferior epigastric artery is noted. Just lateral to the origin of the artery at the site of the internal inguinal ring, the transversalis fascia is nicked, and the vas is picked up as it curves laterally around the artery. Its position is constant and is readily found. At this point one should be on the watch for a prolongation of the peritoneum into the inguinal canal. It is easily opened into, and should be immediately resutured if this is done. A hernia, if present, may be repaired by the McVay technic, working from the posterior wall of the inguinal canal.

The divided rectus sheath is now elevated above and below the line of incision, and the recti muscles are separated in the middle line, carrying the separation well down to the pubic bone. This opens up the space of Retzius and exposes the inferolateral surfaces of the urinary bladder. The bladder is now swept upward with the hand, and the retropubic space is exposed. At this point the Millin self-retaining retractor is put into place, the lateral blades retracting the recti and the middle blade the bladder. Before the middle blade is applied, a narrow rolled taped sponge is placed in the inferolateral surfaces of the bladder, and over this is placed the blade. The blade is then strongly retracted upward, carrying the body of the bladder out of the field and exposing the bladder neck, the sphincteric ring and the prostatic capsule.

The loose fatty tissue on the anterior surface of the prostatic capsule is now brushed aside, clearing the capsule. Any veins that will not retract out of the field may be ligated or fulgurated. I have not seen edema of the penis result from this, although these veins drain the dorsal vein of the penis. The landmarks are now well visualized; the prostate may be palpated in its entirety, and its size, contours and firmness may be noted. The levators are not exposed.

An incision is now made in the midline of the prostatic capsule, commencing about the midpoint of the capsule and running up to and including part of the sphincteric ring. The incision is deepened

until the glistening white fibers of the gland are exposed. The cut edge of the capsule is picked up on either side with tissue forceps and is dissected off the gland for a short distance with the long curved scissors. The incision is now continued upward in the midline, completely dividing the sphincteric ring and the whole thickness of bladder wall for about 1 inch (2.5 cm.). Any urine in the bladder is removed by suction.

The sphincteric ring is now dissected free on either side from the gland as far as the lateral angles. At the same time the bladder mucosa is divided as it is reflected onto the intravesical portion of the lateral lobes. Catgut sutures are now placed in the cut ends of the sphincteric ring for retraction purposes. They are fastened to the retractor on either side.

The lateral lobes of the gland are now dissected free of the capsule on the anterior, lateral and posterior surfaces. A combination of the finger and the long curved scissors is used. In freeing the gland anteriorly below the level of the incision, one must be careful not to extend the incision downward by tearing the capsule during the dissection. Careful use of the scissors will avoid this.

When the dissection is completed, the index finger can easily identify the tip of the gland and the prostatic urethra as it enters the urogenital diaphragm. The gland is now seized with a pair of tenaculum forceps and elevated, the urethra being put on the stretch. The urethra is now cut close to the gland, with the long curved scissors guided by the index finger. The gland can now be elevated from its bed, and a taped sponge is inserted into the cavity to control any oozing.

As the gland is elevated, the capsule is stripped clear posteriorly, and at the posterolateral angles the pedicle blood supply is clamped on either side and divided. A short curved gallbladder or tonsil forceps works well for this purpose. With the scissors, the posterior portion of the sphincteric ring is now dissected free from the gland, the remaining portion of the bladder mucosa being divided at the same time. The gland is then removed.

The blood-supplying vessels are now ligated with catgut on a needle. The taped sponge is removed and the cavity carefully inspected for remaining prostatic tissue. The capsule should be perfectly smooth. Any bleeding points are picked up and ligated as in a tonsil bed.

The center of the posterior portion of the sphincteric ring is now caught with a tenaculum forceps and lifted up for inspection. If there is redundant tissue here, a wedge is excised with the scissors. I now tack the cut bladder mucosa down to the muscle of the sphincteric ring, using interrupted gastro intestinal sutures on a curved needle. This controls any oozing and makes for a neater-looking job. The interior of the bladder is now inspected and freed of all clots.

A three-way Foley catheter is next passed through the penis into the prostatic cavity with the tip in the bladder. I use a size 18 with a 30 cc. bag. The bag rests in the prostatic cavity and is tested for inflation and required size. The bag requires only partial inflation, as several strips of gelfoam may be placed about it to control any oozing in the cavity, and at the same time there is sufficient room to allow the prostatic capsule to contract. I have used the bag both in the bladder and in the prostatic cavity, and I favour the latter, as I feel it controls oozing best.

The prostatic sheath is now closed with interrupted catgut sutures placed with an ordinary needle on a long needle-holder. The sphincteric ring and the bladder wall are closed with interrupted tantalum wire, placed deep to the level of the bladder mucosa. Before the last bladder suture is tied, all clots are removed. As the patient is in the Trendelenburg position, any oozing will tend to run into the bladder and form clots, and they should be removed just before closure. The bag of the Foley catheter is now inflated to the estimated degree.

The retropubic space is now cleared of all clots, and sulfa powder is dusted in. The retractor is removed and the patient placed in the horizontal position. A rub-

ber sump drain is inserted down to the prostatic sheath.

The rectus sheath is closed about the sump drain with interrupted catgut, and the skin is closed with interrupted cotton.

The Foley catheter is connected to an apparatus for gentle suction, and several syringes of saline solution are run through the catheter, making sure it is clear of clots, and also that the bladder is free and bleeding is under control.

The patient, who should be completely aroused by now, is returned to his bed. Blood loss and shock have been minimal. The Foley catheter is connected to a sulfanilamide drip and a Gomco suction apparatus. The sump drain also is connected to the latter. The patient is free to turn in bed, to sit up or to stand by the side of the bed. The irrigation is run continuously for forty-eight hours, the rate depending on the amount of blood in the return. If it appears to be considerable, the rate is increased. During the first twenty-four hours the catheter is syringed often to make sure it is free of clots and has a free return flow. In 2 cases the return flow became blocked and the irrigating solution re-turned via the sump drain. In both cases the bladder apparently collected sufficient clots so that the irrigating solution was forced out through the bladder incision. In each case the bag was deflated and the catheter inserted well into the bladder. The clots were then removed by syringing; the bag was reinflated and allowed to remain in the bladder. Irrigation and suction were then continued in the usual manner. It is therefore important to see that the return flow is via the catheter and not the sump, although some attendants think that is what the sump is put there for.

In the average case the continuous irrigation is stopped on the second postoperative day, and syringe irrigation is carried out every six to eight hours until the catheter is removed on the third or fourth postoperative day. I like to leave the sump drain in for one day after the catheter is removed. If any leakage of urine occurs, I then reinsert the catheter for another three or four days. This occurred in 1 case only.

The patient is allowed to become ambulatory on the third day, and every effort is made to get him back to his normal routine of eating, drinking and bathroom privileges. A fluid balance chart should be maintained for several days, however, as a great deal can be taken for granted with these older patients, and they can easily slip into a dehydrated state.

Penicillin was used routinely in postoperative care until the temperature was normal. Mandelamine tablets, 2 q.i.d., have been the routine urinary antiseptic, until all pyuria has cleared. Pyuria, as a rule, has persisted up to three or four weeks. If it persists beyond this, there must be a reason, and it should be investigated cystoscopically.

SUMMARY

1. A method of retropubic prostatectomy is described. Although this method is a modification of the Millin technic, the author considers the changes important enough to be recorded.

2. The method allows excellent exposure and anatomic dissection and positive control of bleeding, with minimal shock to the patient.

3. The method appears equally applicable in all types of prostatic obstruction and gives complete coverage in this field to the general surgeon or urologist who is not trained in the highly specialized field of transurethral resection.

4. The gland is completely removed, and there is no tendency to stricture formation. Post-operative urethrograms show the prostatic cavity to be confluent with the urinary bladder.

5. Nursing and hospital care are minimal and well suited to a general hospital. Confinement to bed has been shortened, with an early return to normal micturition. For the patient this all leads to better morale and easier economy.

6. Sexual function has not been disturbed.

RÉSUMÉ

1. On décrit ici une technique de prostatectomie rétro-pubienne. Cette tech-

nique, une modification de celle de Millen, est, de l'avis de l'auteur, assez importante pour être mentionnée.

2. Par sa méthode, l'auteur prétend avoir un meilleur champ de vision, une dissection plus anatomique, un contrôle parfait de l'hémostase et presque sans shock pour le patient.

3. Cette méthode s'applique à tous les types d'obstruction prostatique et est de tout repos pour le chirurgien ou l'urologiste non entrainé à la résection transuréthrale.

4. L'adénome est tout enlevé; il n'y a pas de prédisposition au rétrécissement. Une uréthrographie post-opératoire montre que la vessie fait suite à la loge prostatique.

5. Les soins post-opératoires ne sont pas compliqués pour un hôpital général. Le repos au lit est abrégé et le malade s'alimente plus vite. Le patient bénéficie de la sorte d'une quiétude d'esprit et d'une économie pécunière.

6. Il n'y a aucune perturbation de la fonction génitale.

RESUMEN

1. Se describe un método de prostatectomía retropúbica. El autor considera los cambios bastante importantes para ser mencionados, dado que este método es una modificación de la técnica de Millin.

2. El método permite exposición y disección anatómica excelentes y hemostasis efectiva, con choque mínimo para el paciente.

3. El método parece igualmente aplicable en todos los tipos de obstrucción prostática, poniendo completamente a cubierto en este campo al cirujano general o al urólogo no adiestrado en la rama altamente especializada de la resección transuretral.

4. La glándula es completamente extirpada y por ende no existe tendencia a la formación de estenosis. Uretrogramas postoperatorios muestran la confluencia de la cavidad prostática con la vejiga urinaria.

5. Los cuidados del enfermo son mínimos y bien adecuados a un hospital general. Acortamiento de la permanencia en cama, con pronto retorno a la nutrición normal. Todo esto redunda en mejor moral y desahogada economía para el paciente.

6. La función sexual no ha sido trastornada.

RIASSUNTO

1. Descrive un metodo di prostatectomia retropubico. Mentroche' questo metodo sia una modificazione della tecnica ri Millin, l'A. considera i cambii cosi importante di registrarli.

2. Il metodo permette eccellente esposizione e dissecazione anatomica e controllo assoluto dell'emorragia, con minimo shock al paziente.

3. Il metodo appare ugualmente applicabile in tutti tipi d'imbarrazzo prostatico e da' complete rifugio in questo campo al chirurgo generale od urologo chi non e' istruito nel ramo specializzato della risezione transuretrale.

4. La ghiandola e' interamente rimosso, e non c'e' tendenza di formazione stenosante. Uretrogramme postoperatorie dimostrano il cavo prostatico confluente alla vesica orinaria.

5. Cure da guardinfermi ed ospedale sono minimi e convenevole ad un ospedale generale. Constringimento al letto veune abbreviato, con restituzione precoce a nutrizione normale. Pel paziente tutto questo spinge a morale migliore ed economia piu agevole.

6. Lafacolta' sessuale non e' stata disturbata.

ZUSAMMENFASSUNG

1. Es wird eine Methode der retropubischen Prostataresektion beschrieben. Die Methode stellt zwar nur eine Modifikation der Millinschen Technik dar, aber der Verfasser haelt die Abaenderungen fuer wichtig genug um veroeffentlicht zu werden.

2. Die Methode gestattet eine ausgezeichnete Freilegung und anatomische Praeparierung sowie eine positive Blutstillung unter aeusserst geringer Schockwirkung fuer den Kranken.

3. Die Methode zeigt sich als gleich-

maessig anwendbar bei allen Formen prostatischer Obstruktion und deckt auf diesem Gebiet alle Ansprueche des allgemeinen Chirurgen oder des Urologen, der in der hoechst spezialisierten Technik der transurethralen Resektion n i c h t geuebt ist.

4. Die Druese wird vollstaendig entfernt, und es besteht keine Neigung zur Entwicklung von Strikturen. Post operative Roentgenbilder der Harnroehre zeigen, dass die Prostatahoehle frei in die Harnblose uebergeht.

5. Die erforderliche Nachpflege im Krankenhaus ist aeusserst gering und fuegt sich leicht in den Rahmen eines allgemeinen Krankenhauses ein. Die Dauer der Bettlaegerigkeit kann abgekuerzt werden, und eine fruehzeitige Rueckkehr zu normaler Ernaehrung ist moeglich. Dies alles hat einen guenstigen Einfluss auf die Moral des Kranken und erleichtert seine finanzielle Buerde.

6. Die Geschlechtsfunktion wird nicht gestoert.

SUMÁRIO

1. Um método de prostatectomia retrapubica é descrito. Embóra este método seja uma modificação da técnica de Millin, o autor considéra as alteracões suficientemente importantes para serem relatadas.

2. O método permite excelente exposição e dissecção anatomica, como tambem perfeito contróle do sangramento e choque mínimo.

3. O método é aplicavel em todos os tipos de obstrução prostática e proporciona amplo campo operatório ao cirurgião geral ou urologista não treinado em técnicas altamente especializadas de ressecção trans-uretral.

4. A glandula é completamente removida e não ha tendencia á formação de estreitamentos. Uretrogramas pos-operatórios demonstram a confluencia da cavidade prostática com a bexiga.

5. A enfermagem e os cuidados hospitalares são diminutos e não requerem hospital especializado. O periodo de hospitalização foi reduzido, com precóce retôrno á micção normal. Tudo isso redunda em economia e confôrto moral para o paciente.

6. A função sexual não foi perturbada.

REFERENCE

Millin, T.: Retropubic Urinary Surgery. Edinburgh: E. & S. Livingstone Ltd., 1947.

LA PRESSE MEDICALE

La Grand Journal Français de Chirurgie et de Medicine parait chaque semaine, et donne toutes les informations scientifiques et professionelles

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The Problem of the Thyroid Gland from the Standpoint of the Anesthesiologist

JOHN S. LUNDY, M.D., F.I.C.S. (HON.)
ROCHESTER, MINNESOTA

As a rule, the thyroid gland is a matter of concern to the anesthesiologist only when it is abnormal. Medical management of a diseased thyroid gland and preoperative preparation of the patient, except for preoperative sedation, have not been our concern and will not be considered here. Tumors of the thyroid gland do become our problem, however, if the patient suffers simultaneously from some other surgical condition and if a decision is made to operate on the associated lesion prior to surgical treatment of the tumor of the thyroid gland. It is then that the choice of the anesthetic and its management become important. This is equally true when surgical treatment of the thyroid gland is to be undertaken, especially if the tumor is large and regardless of whether or not it is malignant. An indirect problem related to the thyroid gland is presented by the patient with paralysis of the vocal cords caused by previous operation for goiter. Anesthesiologists are particularly concerned with patients who subsequently must undergo such operations as appendectomy or an emergency operation for fracture. Again the choice of anesthesia becomes involved, particulaly for the King operation or for partial excision of the arytenoid cartilage by the Lynch suspension method.

Essentially, the anesthesia for thyroidectomy is aided by complete cooperation with the surgeon in whatever technic he prefers. If he wishes the patient to be able to speak at any time during the operation, obviously he must depend on local anesthesia, with or without the administration of nitrous oxide and oxygen plus preliminary medication (1½ gr. of pentobarbitol sodium administered by mouth the night before operation and the morning of operation, plus a hypodermic injection in the morning of 1/6 to 1/4 grain [0.01 to 0.016 Gm.] of morphine and 1/150 grain [0.00043 Gm.] of atropine).

Infiltration of the line of incision and subsequent infiltration, as the operation progresses, of the tissue to be incised has been carried out on numerous occasions and seems to provide a drier field than is obtainable when infiltration is not employed. As a rule epinephrine is not added to the local anesthetic solution, which need not be stronger than 0.5 per cent procaine or metycaine. I have felt that there was some advantage in infiltrating the line of incision in the field of operation with a solution of procaine containing cobefrin in a dilution of approximately 1:67,000, plus bilateral superficial cervical block. The benefit seemed to be in having some local vasoconstriction without untoward systemic effects.

If failure is encountered with local anesthesia, it is usually because the solution has not been deposited sufficiently on the surface or in and under the skin in order to take care of the pain of the skin incision. Deposition of the anesthetic solution deep into the tissues without superficial infiltration is the usual reason for failure when a local anesthetic is used for making the incision for thyroidectomy.

After the incision has been made, however, and traction is applied to the gland, the patient often complains of distress. It is at this time that nitrous oxide plus oxygen is administered in percentages which allow for at least 20 per cent oxygen in the mixture. The cessation of gas anesthesia soon allows the patient to

From the Section on Anesthesiology, the Mayo Clinic.
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awake, so that he should be able to use his voice. This type of anesthesia is one I am accustomed to for an uncomplicated case, but if the thyroid gland has been large enough to press on the trachea and to soften it much it is not uncommon for the patient to have difficulty in inhaling after most of the gland has been removed and the trachea is no longer splinted by the thyroid tissue. When this happens the trachea tends to collapse as the patient inhales, and the anesthesiologist must be prepared to insert an intratracheal tube. This is best done through the mouth. Most intratracheal tubes are not quite long enough, if inserted through the nose and into the trachea, to reach past that portion of the trachea which is collapsed, whereas intubation through the mouth can be carried out so that the tip of the intratracheal tube reaches almost to the bifurcation of the trachea, making it possible under most conditions to establish an airway.

This same technic of intubation is the one I would recommend for those who wish to anesthetize patients and to operate on them with the use of a general anesthetic from the beginning. In other words, the safest procedure for the patient is oral rather than nasal intubation when general anesthesia is employed for thyroidectomy.

The modern management and preoperative preparation of patients with goiter has greatly simplified the problem for the anesthesiologist. At the time of operation rather crowded conditions may exist at the head of the table, and it has not been too simple to find the means of separating the surgical field from the space occupied by the anesthesiologist. I have made an effort to do this by the use of an anesthetist's screen, which is illustrated in Figures 1 and 2. Although the screen was not designed for this particular use, I find it a valuable solution of the problem of separating the two fields just mentioned. The sterility of the operative field is easily preserved by the drapes being placed over the screen, which adequately separates the sterile from the unsterile

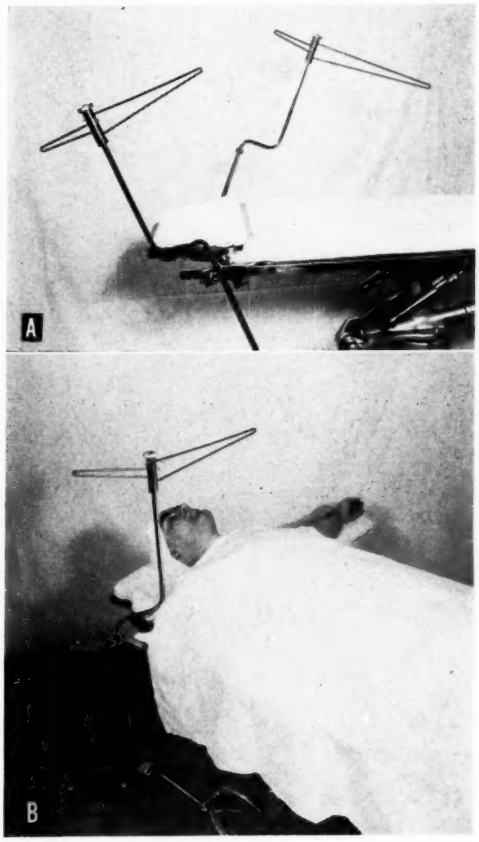

Fig. 1.—*A*, the two sections of the anesthetist's screen are shown attached by clamps to the side rail of the operating table to illustrate some of the many positions in which the screen can be placed. *B*, half of the anesthetist's screen in place as it is used for radical amputation of the left breast.

field. The uprights are close enough to the patient's head so that they do not interfere with the assistants making retraction in the wound or carrying out other manipulations. The fact that the patient's face is hidden from the surgeon can be overcome only by either having him step away from his position for a moment to look around the drape or by attaching a mirror to the screen, so that he may see the patient's face reflected in the mirror.

Of the various anesthetics that have been used for patients undergoing thy-

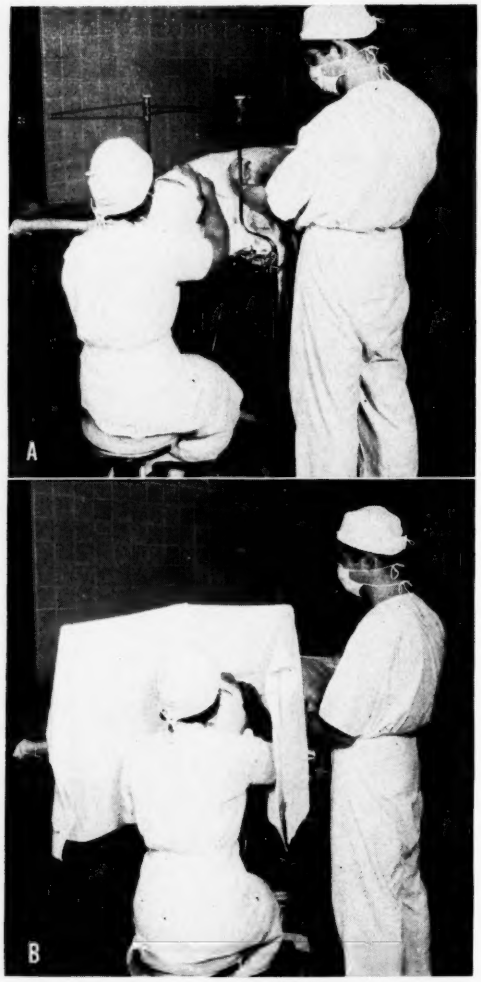

Fig. 2.—*A*, the screen in the usual position for laparotomy. The nurse sits in the position usually occupied by the anesthetist, and the man is standing in the position occupied by an assistant when holding a retractor. The additional space allowed by the screen for this maneuver can be seen. *B*, the screen has been covered with a drape; otherwise, the scene is the same as in Figure 2A.

roidectomy I already have indicated my preference. I have not been impressed with the reports of the use of cyclopropane for this purpose. In my opinion ethylene was and is a good anesthetic for these patients, particularly if there is a coexistent cardiac condition, but nitrous oxide-oxygen plus a small amount of ether is a most satisfactory anesthetic for this operation if general anesthesia only is to be used. The rectal method of administering anesthetics in analgesic doses can be used, but I have not felt the need of it, especially since preoperative preparation has been effective in decreasing the agitation of the patient and the risk of operation as well. I have not felt that intravenous anesthesia was indicated unless the patient was intubated before the operation started.

SUMMARY

The author summarizes his opinion concerning the anesthetization of patients when the thyroid gland has become a factor in the choice and management of anesthesia.

RIASSUNTO

L'A. pone in sommario sua opinione sopra di anestettizzazione dei pazienti quando la ghiandola tiroidea diviene un fattore nella scelta e nel conducimento di anestesia.

RESUMEN

Se resume la opinión del autor para la anestesia de pacientes en que la glándula tiroides es un factor para la elección y administración anestésicas.

RÉSUMÉ

L'auteur résume ses opinions sur l'anesthésie à employer hez les patients subissant une intervention sur la glande thyroide.

ZUSAMMENFASSUNG

Der Verfasser aeussert seine Ansicht ueber die Narkotisierung von Kranken, bei denen die Schilddruese eine wesentliche Rolle in der Auswahl und Durchfuehrung der Narkose spielt.

SUMÁRIO

O autor resume sua opinião relativa a anesthesia de pacientes nos quais a glandula tiroide se tornou um fatôr na escôlha e manejo da analgesia.

The Concept of Mobilization and Its Relation to Poliomyelitis

HARVEY E. BILLIG JR., M.D.,* F.I.C.S.
LOS ANGELES

THERE has been much discussion concerning the approach to therapy in rehabilitation. One approach is to diagnose the disease (poliomyelitis, Little's disease, hemiplegia, multiple sclerosis, Parkinson's disease, etc.) and then institute whatever therapeutic procedures are known for the condition. The other approach is to go a step farther and, disregarding the particular disease, analyze the patient from the standpoint of the particular physiologic and biochemical functions involved.

Following the latter concept as applied to the mobilization of patients with poliomyelitis, it can be noted:

1. Coming on early in the disease is a loss of proper functioning of Sherrington's reciprocal innervation reflex, so that the stretch reflex in the opposing muscles is not damped; hence stiffness and so-called muscle spasm ensue. Varying types of this manifestation can be observed in spastic patients and in those with Parkinson's disease, hemiplegia, etc.

Rhythmic, passive, very slow exercise carried out for thirty to forty minutes several times daily will rapidly restore this reflex in a patient with poliomyelitis, although it may take consistent repetition for four to six months or more to do so in a patient with Parkinson's disease.

2. When an anterior horn motor nerve cell is killed, the whole motor unit is lost and approximately 120 muscle fibers are left without innervation. After eighteen to twenty-one days they begin to fibrillate and are capable of remaining alive (Golseth, Weddle and others).

There is evidence in both animals and man that remaining live motor nerve fibers can expand their arborization both spontaneously and after artificial stimulus to resupply denervated muscle fibers (Van Harreveld; Weiss; Billig; Hodes).

Denervated muscle fibers can, in the meantime, best be kept alive by two methods: first, constant heat, and second, the mechanical stimulus of motion as produced by passive or active exercise or electrical stimulation.

3. Early in life the ectodermic motor nerve fibers make contacts with already contractible developed mesodermic muscle tissue, and the process of coordination comes into play. The baby in the crib instinctively rocks rhythmically in the knee-chest position and later draws itself up the side of the crib to stand shaking the crib to rhythm. Still later, at dancing school, he does exercises to rhythm and completes his sense of coordination.

If the sense of coordination is poor, the child is clumsy and neuromuscular reeducation is impossible.

Active or passively assisted active exercises carried out rhythmically to a set rhythm for thirty to forty minutes daily will adequately develop the sense of coordination, taking about a month at 6 months of age, three months at 6 years of age, and ten months at 10 years of age (Billig; Loewendahl).

4. In normal development of neuromuscular control there is a sequence of so-called patterns, by analysis of which one can determine the stage of a child's development as compared to his chronologic age (Gesell).

In neuromuscular reeducation this must be kept in mind, for there is no point in presenting exercises to the child in terms of developmental patterns he has not yet

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reached. Repetitive proper exercise patterns must be presented in terms of, and preferably in the sequence of, developmental patterns already attained.

5. Superimposed on the basic genetic developmental neuromuscular pattern is an extensive accumulation of conditioned patterns (Pavlov). It is doubtful whether any of these, once developed, is ever completely lost; they are simply overlaid by additional ones as time goes on, and reversion to previous ones can be noted in times of stress; for example, after tendon transplants or in trying to change a baseball batter's stance.

Analysis of the conditioned patterns present is necessary in order to apply neuromuscular reeducation properly. Conditioned patterning comes extensively into play, for instance, in gait training.

6. Endurance is a summation of a number of factors mentioned elsewhere in this paper. Physically speaking, it may be enhanced by a fast, active, rhythmic exercise (Smith—water polo) carried out for thirty to forty minutes daily.

7. For many years "muscle men" have been assiduously tugging on weights, doing bar chinning and push-ups, their muscles meanwhile growing larger and larger and stronger and stronger. Careful measurements and research by DeLorme has shown that hypertrophy of muscle fibers and hence increased power does actually occur and can be therapeutically carried out with reasonable scientific accuracy. Extensive application of this has been carried out for a number of afflictions in addition to poliomyelitis.

8. In the chemical changes of muscular contraction certain basic "muscle foods" are necessary (Borsook). When glycocyamine is fed together with available methyl groups, such as betaine, a progressive increase in muscle power is observed.

9. A number of investigators have recently begun to point out the prevalence of adrenocortical steroid endocrine deficiency in cases of poliomyelitis (Boines; Billig). Szent Gyorgyi, working on muscle fiber metabolism, included mention of the importance of the adrenal steroids to adequate muscle fiber function in his Nobel Prize work of 1944.

10. The great trend toward high protein diets in the presence of debilitation (Sidney Portis) has brought to light interesting developments for use in poliomyelitis. It has now become clear that a diet high in protein and very low in carbohydrate (Billig) will create a positive nitrogen balance, build up muscle (protein) and take off excess of fat even though the caloric intake is not reduced or the amount of fatty foods restricted. This is connected with the liver-pancreas (beta cells of islets of Langerhans insulin production) stimulus by readily available carbohydrate in the diet. In a special way the level of insulin production is connected with the direction of metabolism of foods into fat or protein, hence controlling the nitrogen balance.

11. Orthopedic consideration of mechanical factors, osteotomies, joint stabilizations, tendon transplants, etc., require a widespread knowledge to include careful statistical (Steindler) evaluation of procedures. With children it is always well to keep in mind the consideration of change during subsequent growth. Various equalizations of leg length, such as bone-shortening or bone-lengthening operations, have begun to give way to epiphyseal arrest (Phemister) of the faster-growing leg at the length the slower growing leg is expected to reach by the time its growth ceases. Better statistical data for calculating this is now becoming available. Scoliosis has remained a resistant problem (Cobb), and many analyses of vectors of muscle pull have attempted to show the cause for deviations when weakness in certain muscles supervenes. It may be pointed out that following the old illustration of the spine's mechanical resemblance to a triangular rod, all the pertinent mechanical principles involved in a triangular rod should be taken into account in treatment. These are: 1. When a triangular rod is fixed at both ends, then twisted (rotated) in the center it must also deviate laterally in the center. 2. Conversely, when a

triangular rod is fixed at both ends and then deviated laterally in the center, it must also twist (rotate) in the center. Too frequently attempts are made to correct a scoliosis by means of fixing one end of the triangular rodlike spine and then trying to untwist the rotation and correct the lateral deviation. In order to correct the scoliosis it is necessary to fix the spine at *both* ends of the curve by teaching the muscles to pull in these two localities in the same direction and then teach the muscles in the region of rotation to pull in the opposite direction (derotation direction). The lateral deviation (scoliosis or curve) will be corrected at the same time. Huge amounts of motivation are necessary, however, to keep many of these patients diligent in treatment.

12. Finally comes the problem of contractures. As ordinarily visualized, contractures of fibrous tissue are too frequently restricted to a few localities; e.g., plantar flexion contracture of the foot, flexion contracture of the knee or flexion-abduction contracture of the hip. Fibrous tissue is really the connective tissue framework of the body, making up not only the capsule of joints, major ligaments, ligamentum flavum and fascia, but also the compartmentation within the organs surrounding each nerve fiber (neurolemma) and muscle fiber (sarcolemma), etc., and all connecting together as do the walls, ceilings, and floors of a great mansion of many rooms.

Passing through foramina in the fibrous tissue layers are the peripheral nerves, coursing from the spinal cord to their peripheral distribution.

The marked tendency for poliomyelitics to develop contractures is widely recognized. These contractures then cause deformities, and marked crippling occurs. In fact, one of the first signs of meningismus presaging an attack of poliomyelitis is a "stiff neck", and sometimes by the time the patient is admitted to the hospital he may be as "stiff as a plank". This is not all muscle spasm, since, as the days go by and muscle spasm recedes, the connective tissue contractures become obvious by the marked restriction of range of motion. If this is allowed to remain fixed, contractures will develop and deformities will result.

The limitation of range of motion caused by contracted fibrous tissue prevents proper balance and use of the body. In other afflictions, such as arthritis, with which contractures tend to develop, painstaking study of the fibrous tissue and its reactions (W. W. Bauer) has shown that mobilization entails progressive accumulative loosening by means of mechanical passive and active stretching. This stretching is repeated frequently, consistently, and each time just a bit past the point of restriction, so that it is carried far enough for a stretch but not for a tear. It must be remembered that when muscles are allowed to remain shortened for too long, the fibrous tissue framework in them will contract and it will then be necessary to lengthen this fibrous tissue by the same technic.

Considerable light has recently been focused on fibrous tissue by the Nobel Prize-winning work of Hench and Kendall. The fact that fibrous tissues, and hence fascia and ligaments, have shortening and lengthening capabilities (contractility common to all protoplasm) has been too little appreciated. The remarkable speed with which fibrous tissue physiologically loosens under the influence of the adrenal cortical steroids, as shown by Hench and Kendall, gives a clue to their usefulness in poliomyelitis. Hence we have now both a physical therapeutic progressive accumulative loosening by passive and active stretching and an endocrine treatment for correction of contracted fibrous tissue. Recently there has been published a guide for mobilization of the various parts of the body (*Mobilization of the Human Body,* Billig and Loewendahl, Stanford Press) and a companion moving picture of the same title (Association Films, Inc.) illustrating the technics.

SUMMARY

A number of the physiologic functions of the human body are presented, with suggestions as to how therapy directed toward improving their function may aid in mobilization of the poliomyelitic patient.

ZUSAMMENFASSUNG

Es werden Vorschlaege gemacht, wie mittels einer auf die Verbesserung gewisser physiologischer Funktionen des menschlichen Koerpers gerichteten Therapie zur Erhoehung der Beweglichkeit an Kinderlaehmung leidender Kranker beigetragen werden kann.

RESUMEN

Se presenta cierto número de funciones fisiológicas del cuerpo humano, con sugestiones de como mejorarlas terapéuticamente para poder ayudar en la movilización del paciente poliomielítico.

RIASSUNTO

Presenta una quantita' delle funzione fisiologiche del corpo umano, con suggestioni che come terapia diretto verso il miglioramento di loro funzione puo' soccorrere nella mobilitazione del paziente poliomielitico.

RÉSUMÉ

On présente ici quelques unes des fonctions physiologiques du corps humain avec des suggestions pratiques en vue d'aider la mobilisation des patients ayant souffert de poliomyélite.

SUMÁRIO

Um número de funções fisiológicas do corpo humano é descrito, sugerindo o módo pelo qual a terapêutica empreendida no sentido de aumentar a eficiencia dessas mesmas funções póde influir favoravelmente na mobilização de pacientes com poliomielite.

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Editorial

No Comment

On the eighteenth of December in the year 1947, a letter was sent from the International College of Surgeons to the young man with whose portrait we honor this page. The letter was short and carried the season's greetings, although it may not have reached its destination by Christmas; for it had a long way to go. and where it was going the mails were in great confusion.

The letter bore another message as well. It began, "Dear Dr. Wallace: It is our great pleasure to notify you that, at a recent meeting of the International Board of Trustees, you were elected a Fellow of the International College of Surgeons, with all rights and privileges pertaining thereto. Enclosed is your identification card, which constitutes a surgical passport among surgeons all over the world."

In due time an answer came, expressing great pleasure; and from time to time came others, though not often. They were never long. There was no time to spare. For Dr. Wallace, then only thirty-eight years old, was serving as head of the surgical department at the Stout Memorial Hospital, Wuchow, China, in the line of duty of a Baptist medical missionary. No words were needed to tell us what that meant—the hardships under which his work was done, the unremitting kindness of his nature, the endless patience and fortitude required. From others, never from him, we heard of his devotion. Spokesmen of other faiths forgot their differences, and wrote us of service that filled us with honest pride. Such men as this, we thought, are the soul of the College; in their humility no less than in their strength lies the embodiment of the ideals that beckon us all. We never had a letter from Wuchow without feeling a resurgence of hope for humanity's future.

Dr. William L. Wallace

But we shall get no more letters from Bill Wallace. The Chinese Communist Party, in its valiant endeavors to remake the world, found Bill Wallace's presence in China an inconvenience. He was a living example of all that they abhorred. More than that, he had influence, quiet as he was. No selfless life is devoid of effect upon others.

What could be done? There seemed no point of attack. If he would only take sides . . .

But he would not take sides. He was a surgeon. He had no discrimination. To all alike, well-wishers and secret foes, his professional skill and his personal kindness were available. This kept him busier than they approved of.

If he would only make a slip, say something . . .

But whenever he talked, he only talked like a doctor.

If he would show fear, resign and go away . . .

But he would not. Whether he was devoid of imagination and did not see his danger or whether he was so naive as never to have considered the matter at all, the Communists could not decide. But they decided that something must be done, and they set about it with their customary efficiency. Let us hear the rest of the story from an official source, a letter written by Dr. Baker James Cauthen, Secretary for the Orient to the Baptist Foreign Missions Board to Dr. M. Theron Rankin, Executive Secretary: "At 3:00 a.m. on December 19, thirty or forty Communist soldiers came to the entrance of the hospital saying they had a sick man who needed attention. When the door was opened they rushed into the grounds and surrounded Dr. Wallace's house.

"They awakened Dr. Wallace, searched his house, and ordered him to call the staff to the top floor of the hospital. About thirty minutes later, when the entire staff were there together, the Communists asked that two of them go along to witness a careful searching of Dr. Wallace's room. One of the doctors and a pastor were selected, and Dr. Wallace and the servant who had worked with him for many years accompanied them.

"Upon searching the room they found an outboard motor which Dr. Wallace used with his boat. This caused some comment but was quickly explained. Then they searched his bed and found a pistol under the mattress. Dr. Wallace told them that he had never had a gun in Wuchow. The servant said that he had made up the bed every day and he knew the gun was not Dr. Wallace's and had not been in the room before the Communists came. It was evident that the Communists had put the gun in Dr. Wallace's bed during the time the hospital staff was assembled on the top floor.

"Dr. Wallace was taken away about 5:00 a.m. On February 10 he died in a Communist prison. The exact cause of death is not known."

We do not know and therefore cannot tell you what happened during those fifty-three days in prison. Dysentery? Perhaps. Cholera? Again, perhaps. The Communists would know, but they are not talking. All we record here is the bitter fact that in this grim manner ended, in the zenith and prime of manhood, the sacrificial career of William L. Wallace, M.D., F.I.C.S., whose only crime was that he "went about doing good."

—M. T.

The belief in a supernatural source of evil is not necessary; men alone are quite capable of every wickedness.

—Conrad

It is just as well that justice is blind; she might not like some of the things that are done in her name.

—Bagehot

Behold a thing worthy of a god, a brave man matched in conflict with adversity.

—Seneca

We think our civilization near its meridian, but we are yet only at the cock-crowing and the morning star.

—Emerson

New Horizons

By the Editor

From Generation to Generation

"Why is it," a nonmedical friend asked us recently, laying down a copy of the *Journal* at which he had been gazing with a respectful but slightly glazed expression, "that once a man enters the medical profession it is almost safe to wager that his sons and his grandsons will follow suit? Is it heredity, or a virus, or what?"

"Let us not call it a virus, if you please; the word is unpleasant. You may call it a contagion if you like, or, better still, an affection. As to your question, the etiologic factors as regards the total syndrome are not clear, although it is probably safe to assume that any hereditary influence was ruled out by the exhaustive clinical and experimental investigations of Viscus and Vomer in 1926, with which, no doubt, you are perfectly familiar."

"Er—yes," said our friend, "I believe I do remember. Well, no doubt they knew what they were talking about." And he changed the subject, we cannot imagine why.

We were disappointed, too, having had some suggestions to make. Certainly in no other profession, with the possible exception of the military, is there so strong a continuity of tradition. There must be a reason behind it. Flattering as it would be to assume that our sons follow us down the hospital corridor for the sake of our *beaux yeux*, it is pretty thin from any rational standpoint. There must be something beyond ourselves that attracts them.

The uniform? Well, the uniform is a good one. It is white, a hopeful color and usually welcome. It is never soiled except in the line of duty, and its constant renewal has a wholesome effect.

The power? Well, yes, it is quite a thing to save life. It teaches a man humility, for one thing. He is never quite able to believe he has done it alone.

The prestige? Undoubtedly there is prestige to be had, and not of the common or garden variety, either. Prestige with the world is shallow in comparison. When a man's work is of a kind to give him even occasional standing *with himself*, he has confronted the hardest court of appeals on earth and has come away without a stain on his honor.

Whatever the ultimate meaning of life may be, the physician or surgeon is neighbor to the Source. Perhaps it is this that brings his sons to his side. Youth is, of all things else, an era of perception. We smile good-naturedly at its so-called follies, but none of us have memories so poor that we cannot recall our youthful aspirations, so pathetically mingled with uncertainty and frustration. We remember too well the embarrassment that kept us tongue-tied about what we felt most profoundly, and the anguish of feeling that nobody understood us or believed in our powers. Yet there was dignity in us, and we knew it. We remember how we longed for solid ground under our feet, for challenging work to try us and prove our mettle. We were altruists, too—not practical, but how earnest! If willingness could have done it, we would have saved the world twice a week.

Now for young persons of this constitution—and there are plenty of them in any age of the world, including this one—the medical profession offers almost a magic grouping of satisfactions to meet these desires, and for the most part it fulfills the promise. Backbreaking work and heartbreaking disillusionment are involved, but this is a universal and not a peculiar experience. The "virus" of which our friend spoke is unique among viruses, being wholly benign. The affection it generates, though in most cases incurable, confers immunity to certain more dangerous plagues. Barring complications (the commonest of which, perhaps, are acute inflammation of the ego and persistent myopia with regard to the achievements of others), we may venture to say the prognosis is excellent.

Chapter News

International College of Surgeons

United States Chapter

Arnold S. Jackson, M.D., F.A.C.S., F.I.C.S., Secretary

Annual Assembly: Plans for the Annual Assembly, to be held September 10, 11, 12 and 13 at the Palmer House, Chicago, are now nearly complete, and indications are that last year's record attendance will be exceeded. All members of the College who have not yet made reservations are urged to do so at once to avoid disappointment. This is especially true of banquet reservations, as seating capacity is limited to 1,100. Dr. Chester W. Trowbridge, who has so capably handled the banquet arrangements in the past, will again act as chairman.

The programs will run from Monday morning, September 10, through Thursday afternoon, September 13. There will be several innovations in the way of sectional meetings. The newly-formed Section on Obstetrics and Gynecology will hold its first meeting on Wednesday morning, and a joint meeting with the Urological Section is contemplated in the afternoon. Dr. Gilbert F. Douglas of Birmingham is Chairman of the Obstetrics and Gynecology Section. Drs. M. Leopold Brodny, Boston, and C. K. Church, New York, are arranging the program for the Urological Section, which lists several of the leading urologists in the country.

Dr. Edward L. Compere, Professor of Orthopedics at Northwestern Medical School, is acting as Chairman of the Section on Orthopedics and, with Dr. Carlo Scuderi, Secretary, is arranging an interesting program for those in this field.

The newly created Section on Occupational Surgery will hold a half-day program under the direction of Dr. Chester C. Guy of Chicago. Another newly formed group, the Section on Plastic Surgery, will also have a program for the Chicago meeting. The Eye, Ear, Nose and Throat Section is preparing a well balanced program, and they have obtained several noted authorities in this field.

The General Assembly program has been planned to follow along the general lines of the Atlantic City and Cleveland Assemblies, with special emphasis on practical phases of surgery. Papers will be presented by leading authorities of Canada and the United States on subjects of interest and value to the general surgeon, by men who have attained success in their particular specialty. There will be no "repeaters" from last year's program. This assures the audience of the opportunity to hear new speakers but on new, stimulating subjects. Most speakers are allowed twenty minutes, and each will be limited to his alloted time. Three outstanding English-speaking foreign guests will be invited to participate. Dr. Max Thorek will make the selections.

Those particularly interested in surgical research will have an opportunity to attend a two-hour program presented by young surgeons working in these fields under the direction of Dr. Karl A. Meyer, Professor of Surgery at Cook County Post Graduate School of Medicine.

A partial list of speakers follows:

Monday morning: A Symposium on colon surgery with a basic science review of the anatomy, pathology, roentgenology and an internist's view of the important diagnostic criteria, will be given by Drs. Sidney A. Portis, Jacob Glassman, Hans Popper, James T. Case, Raymond W. McNealy, Peter A. Rosi and Francis D. Wolfe, all of Chicago.

Monday afternoon: Drs. Leo J. Starry, Oklahoma City; Frank R. Peterson, Cedar Rapids; Harry E. Bacon, Philadelphia; Martin Nordland, Minneapolis; Charles S. White, Washington, D. C.; Douglas U. McGregor, Hamilton, Canada; and Fred R. Harper, Denver, will speak on general surgical subjects.

Monday evening: Canadian members will meet for a business meeting and dinner at 5:30. At 8 a scientific motion picture program, under the direction of Dr. Philip Thorek, will be a special feature, with the author of each film present for discussion.

Tuesday morning: Among the speakers on a panel discussion on acute surgical diseases of the abdomen are Dr. Charles W. Burns, Professor of Surgery at Winnipeg; Dr. Ralph R. Coffey, Kansas City, and four prominent Chicago surgeons. Following this is a symposium on cardiovascular surgery, with papers presented by Drs. E. G. Fell, Chicago; Willis

J. Potts, Chicago; Felix L. Pearl, San Francisco, and Saul S. Samuels, New York.

Tuesday afternoon: Speaking on general surgical subjects are Drs. Stanley Maxeiner, Minneapolis; Russell M. Kurten, Racine, Wisconsin; Amos R. Koontz, Baltimore; Alfred W. Adson, Rochester, Minnesota; Samuel F. Marshall, Boston, and Charles T. Dotter, New York.

Tuesday evening: Ten-minute papers of interest to the general surgeon will be given by speakers from the Urological Section and from the Section on Obstetrics and Gynecology.

Wednesday morning: A symposium on acute intestinal obstruction, presided over by Dr. George Curtis, features Drs. Willis D. Gatch, Indianapolis; Ira H. Lockwood, Kansas City; Claude J. Hunt, Kansas City, and Franklin I. Harris, San Francisco. Following the symposium is a panel discussion on the same subject, at which the participants, with Dr. Herbert Acuff acting as moderator, are Drs. Philip Thorek, Chicago; Guy V. Pontius, Chicago, and Thomas B. Noble Jr., Indianapolis.

Wednesday afternoon: Papers will be presented by Drs. Lyon H. Appleby, Vancouver; William J. Thompson, St. Louis; Dewey J. Bisgard, Omaha; Everett Coleman, Canton, Illinois; Roland Klemme, St. Louis, and Willard Bartlett, also of St. Louis.

Wednesday evening: The Annual Banquet will be held at the Palmer House, with Dr. Max Thorek acting as toastmaster. The featured speaker will be announced later.

Thursday morning: Speakers on this program are Drs. J. W. McRoberts, Sheboygan, Wisconsin; Luther E. Holmgren, Madison, Wisconsin; Louis P. Good, Texarkana; Harvey S. Allen, Chicago; and two Junior College members, Drs. William B. Hobbins and Hyman S. Lans, both of the Cook County Post Graduate School.

Thursday afternoon: Participating in this session are Drs. Henry W. Meyerding, Rochester, Minnesota; Curtis Lee Hall, Washington, D. C.; George J. Garceau, Indianapolis; Phil C. Kline, Temple, Texas; Charles W. Mayo, Rochester, Minnesota; and three foreign guest speakers.

Thursday evening: The Convocation of the College will be held on this evening, with Dr. Harry A. Oberhelman acting as general chairman. Members of his committee are Drs. Ernest Purcell, Francis D. Wolfe, C. M. Carey, and Clement L. Martin. The program, as well as directions for the candidates, will be mailed in advance, and newly elected members will attend the Thursday afternoon scientific sessions. Convocation rehearsal will be held from 4:30 to 5:50 p.m., Thursday.

Junior College: All members of the College are reminded to encourage eligible resident surgeons to seek membership in the Junior College. It is hoped that the placement of two Junior College members previously mentioned on this year's program will encourage others to write papers and assist themselves in the preparation for Associate memberships in the Senior College.

Scientific Exhibits: A new attraction at the Chicago Annual Assembly will be the addition of scientific exhibits.

There will be no television program of surgical operations at this year's meeting.

Regional Meeting in Indianapolis: A highly successful regional meeting was held at Indianapolis on April 9, in the auditorium of the Indiana University Medical School. Approximately 200 surgeons from Indiana, Illinois and Michigan were in attendance.

Dr. Thomas B. Noble Jr. acted as chairman of the meeting and was assisted by the Indiana Regent, Dr. George J. Garceau, and several committee chairmen.

After the all-day scientific program, dinner was served at the Columbia Club, followed by addresses by Dr. Max Thorek and Dr. Henry W. Meyerding, the Hon. Henry S. Schricker, Governor of Indiana, and the Hon. Phillip L. Bayt, Mayor of the City of Indianapolis, gave addresses of welcome to the group.

Following is the scientific program:

W. P. Moenning, M. D., Indianapolis, *Sterility.*

L. C. Roettig, M. D., Columbus, Ohio, *Chemical Debridement of Wounds.*

J. H. Strickler, M. D., Minneapolis, *Nonoperative Treatment of Common Duct Stones.*

U. G. Dailey, M. D., Chicago, *Vagotomy and Phrenic Nerve Crush.*

J. A. Bargen, M. D., Mayo Clinic *Surgical Indications in Various Forms of Ulcerative Colitis.*

L. W. Freeman, M. D., Indianapolis, *Spinal Cord Regeneration.*

C. S. Beck, M. D., Cleveland, *Operations for Coronary Disease.*

A. S. Jackson, M. D., Madison, Wis., *Modern Concepts of Thyrotoxicosis.*

Philip Thorek, M. D., Chicago, *Recent Trends in Oesophageal Surgery.*

John Sullivan, M. D., New York, *Hernia.*

Herbert Acuff, M. D., Knoxville, Tenn., *Transthoracic Approach to Upper Abdominal Problems.*

New England Regional Meeting: This meeting was held in Boston on March 28 and was well attended. Dr. M. Leopold Brodny of Boston was the chairman of the one-day scientific session. The meeting was concluded with a banquet in the evening.

Following is the scientific program:

James A. Lamphier, M. D., Boston, *Recent Progress in Gynecology and Obstetrics.*

Gordon M. Morrison, M. D., Boston, *Some Aspects of Modern Bone and Joint Surgery.*

Malvin F. White, M. D., Boston, *The Role of Plastic Surgery in the Treatment of Malignant and Benign Skin Lesions.*

M. Leopold Brodny, M. D., Boston, *Criteria for the Four Types of Prostatectomy.*

Philip Thorek, M. D., Chicago, *Modern Concept on Surgery of the Esophagus.*

Alexander J. A. Campbell, M. D., Boston, *Indications for Surgery in Peptic Ulcers.*

Plastic Surgery Section: The officers for the newly organized Plastic Surgery Section of the United States Chapter of the International College of Surgeons are as follows:

Chairman: Neal Owens, M.D., New Orleans.
Vice-Chairman: C. R. Straatsma, M.D., New York.
Secretary: William Milton Adams, M.D., Memphis.
Assistant Secretary: Leon E. Sutton, M.D., Syracuse, N. Y.

The Credentials Committee consists of the following members:

George W. Pierce, M.D., San Francisco, California.
Lyndon A. Peer, M.D., Newark, N. J.
Edward A. Kitlowski, M.D., Pittsburgh, Pa.
Kenneth L. Pickrell, M.D., Durham, N. C.
Robert E. Moran, M.D., Washington, D. C.

Dr. Halligan Honored: Dr. Earl J. Halligan, F.A.C.S., F.I.C.S., Regent of the State of New Jersey, has been appointed Surgeon-in-Chief and Director of Surgery of the Jersey City Medical Center.

Dr. Brailsford To Conduct Lecture Course: Dr. James S. Brailsford, F.I.C.S., upon whom the title "Emeritus Director of Radiological Studies in the Living Anatomy," at Birmingham University, will lecture daily on bone and joint roentgenology for one week at the Royal Orthopaedic Hospital of Birmingham, England. The lecture course extends from July 1 to 7 inclusive. All members of the College are cordially invited to attend. The lectures will proceed as follows:

Monday.—1. Congenital deformities of bone and joints; extent, distribution and character. Influence of heredity and environment on development.

2. Bone and Joint Dysplasias and Dystrophies; hereditary and other factors of influence; types of deformity produced; secondary developments.

Tuesday.—Deficiency, endocrine and hematologic diseases; familial influence; secondary changes.

Wednesday. — Conditions producing osteoporosis; conditions producing increased density of bone.

Thursday.—Injuries of bones and joints; immediate and latent roentgen changes; later secondary changes.

Friday. — Inflammatory diseases of bones and joints; latent periods.

Saturday.—Benign and malignant tumors of bone.

The mornings will be spent in lectures and film reading sessions; the afternoons in demonstrations of cases under treatment, and the evenings to sightseeing in Stratford, Warwick, Ludlow, etc.

Dr. Manzanilla Reelected: Prof. Dr. Manuel A. Manzanilla, F.I.C.S., of Mexico, Faculty Member of the School of Medicine of the National University of Mexico and International Vice-President of the International College of Surgeons, has been reelected Vice-President of the National Academy of Science of Mexico.

Turkish Chapter: The Turkish Chapter has announced that its second meeting this year will be held in Istanbul on May 12, 1951. All members of the College are cordially invited to attend. Complete information may be obtained from the Secretary of the Chapter, Prof. Dr. Dervis Manizade, Professor of Surgery, University of Istanbul.

General News Notes

Dr. Goldstein Honored: On June 11, 1950, the New Jersey Gastroenterological Society presented a testimonial award to Dr. Hyman Isaac Goldstein for "distinguished contributions to medical science, particularly in the fields of gastroenterology and medical history."

Dr. Goldstein read his first medical paper before the Camden County Medical Society in 1911 and since that time has had over one hundred and fifty articles published, notably upon gastroenterologic, cardiologic, hematologic and medicohistorical subjects.

He was born in 1887 in Baltimore, Maryland, and was graduated in 1909 from the University of Pennsylvania where he studied medicine under a scholarship. He did postgraduate study at the University of Vienna. Since the completion of his education, over a period of forty-two years, he has been practicing medicine in Camden, New Jersey. He received a state license as health officer of New Jersey in 1913 and as sanitary inspector, first class, of New Jersey in 1916. He was consulting physician at the Deborah Sanatorium in Brown Mills, New Jersey, attending physician at the Mount Sinai Hospital and associate visiting physician at Philadelphia General and Northwestern General Hospitals in Philadelphia.

Dr. Goldstein has lectured on many occasions at American and European medical congresses, conventions and colleges. He was a member of the International Medical Congresses for the years 1931, 1932, 1935 and 1937. In 1937 he was selected as a delegate to present a symposium on liver diseases and their relation to the nervous system at the International Congress in Vichy, France. In recognition of his medical accomplishments he has been elected to various honorary positions and to honorary memberships in medical societies. Dr. Goldstein is an honorary member of the National French Society of Gastroenterology in Paris, the Italian Society of Gastroenterology in Rome and the Belgian Society of Gastroenterology in Brussels and is a corresponding member of the Hungarian Dermatological Association in Budapest, the Cuban Society of Cancerology in Havana and the Cuban Society of Dermatology and Syphilography in Havana. He is a life member of the American Medical Association of Vienna and a member of the Union Therapeutique of Paris. Dr. Goldstein is also a member of the following American medical societies: the American Medical Association, the International Society of Internal Medicine, the International Society of Gastroenterology, the American Heart Association, the American Association for Advancement of Science, the American Trudeau Society, the Camden County Medical Society, the Medical Society of New Jersey (past secretary and past chairman of the Section on Gastroenterology and Proctology), the New Jersey Heart Association, the New Jersey Gastroenterological Society (past president and a founder), the Northern Medical Association of Philadelphia (past president) and the Medical Club of Philadelphia.

The Journal of the International College of Surgeons extends its congratulations to Dr. Goldstein for his recent award by the New Jersey Gastroenterological Society and for the completion of forty rich years of productive work in the field of medicine.

International Society of Orthopaedic and Traumatic Surgery: This society will hold its fifth congress in Stockholm, Sweden, from May 21 to 25, 1951. The subjects principally to be discussed are "Avitaminosis and Bone Changes" and "Low Back Pain and Sciatica." A number of miscellaneous papers of common interest will also be presented. The secretary of the Congress is Dr. Anders Karlen, Karolinska Institutets Ortopediska Klinic, Stockholm.

Mass Radiographic Study in Eire: The Department of Health in Eire has created a limited nonprofit company known as the National Radiography Association. The purpose of the organization is to provide miniature mass radiographic mobile units which will operate throughout Eire in cooperation with local civic health authorities. The service is modeled on that operating in Sweden. Mass radiographic procedures are being conducted in Dublin and in County Cork.

Ambulatory Fracture Association: This organization announces the election of the following new officers: President, Roger A. Vargas, M.D., 1181 N. Mt. Vernon Avenue,

San Bernardino, California; First Vice-President, F. Wayne Brewster, M.D., 414-16 East Avenue, Holdrege, Nebraska; Second Vice-President, C. Philip Fox, M.D., 305 People's Bank Building, Washington, Indiana; Secretary-Treasurer, H. W. Wellmerling, M.D., 626 Griesheim Building, Bloomington, Illinois. The Board of Governors consists of the following members: Custis Lee Hall, M.D., 1801—I Street, N.W., Washington, D. C.; Alfred E. Gallant, M.D., 727 W. Seventh Street, Los Angeles, California; Irvin H. Scott, M.D., Scott Medical Bldg., Sullivan, Indiana; Ivan N. Boyer, M.D., Colwell-Arnold Bldg., Kittanning, Pa.; Nathan E. Bear, M.D., Monroe Clinic, Monroe, Wisconsin; Homer D. Junkin, M.D., The Paris Hospital, Paris, Illinois; Ralph E. Mueller, M.D., 600 Professional Bldg., Kansas City, Missouri, and James A. Valentine, M.D., 2158 S. Ashland Avenue, Chicago, Illinois.

Brazilian Society on Sterility: The following officers of the Brazilian Society on Sterility were elected for 1951-52, at a meeting held on January 23, 1951: President, A. Campos da Paz Filho; Vice-Presidents, Claudio Goulart de Andrade, Victor Rodrigues, Alvaro de Aquino Salles; General Secretary, H. França de Faria; Secretaries, Armindo de Oliveira Sarmento, Henrique Duék, Afrânio B. Matos; Speaker, Jorge de Rezende; Treasurer, Carlos de Menezes Campos; Librarian, Alipio Augusto; Editors for Publications, Ruy Goyanna e Jorio Salgado; Director of Museum, Osmar Texeira Costa; Committee on Gynecology, Arnaldo de Moraes (Chairman), Clarice do Amaral, Paulo Barros; Committee on Obstetrics, O. Rodrigues Lima (Chairman), Guilherme Serrano, Waldyr Tostes; Committee on Urology, Guerreioro de Faria (Chairman), Alberto Gentile, Adib Antonio Couri; Committee on Endocrinology, José Schermann (Chairman), B. Albagli, José Procopio do Valle; Committee on Roentgenology, Nicola C. Caminha (Chairman), Carlos Osborne, Bruno Lobo; Committee on Pathology, Amadeu Fialho (Chairman), José Bica, Ernani T. Torres; Committee on Laboratories, Nelson Castro Barbosa (Chairman), Saúl Carneiro, Dib Gebara; Committee on Urology, Guerreiro de Faria (Chairman), Séve Neto, Nuno Lisbôa; Committee on Admissions, Clovis Corrêa da Costa (Chairman), Octacilio Gualberto, Jorge Rodrigues Lima.

International Congress of Military Medicine and Pharmacy: This Congress will convene in Paris June 17 to 23 under the patronage of the President of the French Republic. The chairman will be Inspecting Physician General Jame. The Congress is open to all physicians, pharmacists, veterinarians and officers of the administrative services. The program deals with world-wide health problems. For information address General du Congres, Section Technique du Service de Santa, 8 bis des Recollets, Paris 10, France.

Thirteenth British Congress of Obstetrics and Gynaecology: This Congress is scheduled to be held at Leeds, Yorkshire, July 8 to 11, 1952. Abnormal uterine action in labor, stress incontinence of urine, the pediatrician in a maternity unit, and female genital tuberculosis are listed as subjects for discussion.

Plastic Surgery Awards, 1951: The Foundation of the American Society of Plastic and Reconstructive Surgery offers Junior and Senior Awards for original contributions in Plastic Surgery.

Junior Award: Two scholarships in Plastic Surgery of 6 and 3 months respectively.

The contest is open to plastic surgeons in the specialty not longer than five years.

Senior Award: For the best essay on "Mass Treatment of Burns in Atomic Warfare."

The winning essays will appear on the program of the forthcoming annual meeting of the American Society of Plastic and Reconstructive Surgery to be held at Colorado Springs, Colorado, Oct. 31-Nov. 2, 1951.

All entries must be received by the Chairman not later than August 15, 1951.

For full particulars write to the Award Committee, c/o Jacques W. Maliniac, M.D., 11 East 68th Street, New York 21, N. Y.

Mr. Zimmer Deceased: It is with deepest regret that we record the recent death of Mr. J. O. Zimmer, President and Founder of Zimmer Manufacturing Company, Warsaw, Indiana. Mr. Zimmer, a pioneer in his field, organized the company in 1927 and has been president continuously since that date. Under his leadership the firm has worked closely with leading surgeons and hospitals to develop equipment needed for new technics and procedures. He was held in high esteem by the profession.

New Books

A Textbook of X-Ray Diagnosis. By British authors, edited by S. Cochrane Shanks and Peter Kerley. Philadelphia and London: W. B. Saunders Company, 195. 2d ed., vol. 2. Pp. 702, with 605 illustrations.

This massive work, the second of four volumes, deals with roentgen diagnosis of thoracic disease. As would be expected, the majority of the 605 illustrations are roentgenograms of the chest.

Seventeen prominent British authorities, including the two editors, have contributed to this volume. Publication has been delayed by the exigencies of war's aftermath in Britain, but the final result is well worth waiting for. The first edition appeared ten years ago, and it goes without saying that much material of value can be presented now which was not then available. A special effort has been made to bring the entire work up to date in every possible way.

There are only two formal divisions in Volume 2, which, of course, means, that each one is a book in itself. The first is devoted to the cardiovascular system as related to the organs, tissues and structures of the thorax; the second, to the respiratory system and diseases referable thereto.

A compendium of this kind, the work of a number of authors in succession, is always of interest to the thoughtful reader. In this instance the interest is even greater than usual, not only because of the recent technical advances included but because, despite the great length of the book, not a word is wasted. Every surgeon and every roentgenologist will find it a worth-while addition to his library shelves and a dependable aid in his practice.

Pedicle Flaps in Plastic Surgery. By Gordon B. New and John B. Erich. Springfield, Ill.: Charles C. Thomas, Publisher, 1950. Pp. 104, with 76 illustrations. (A monograph in the series **American Lectures in Surgery.**)

In this concise work the authors have covered their subject thoroughly within surprisingly small compass. In their introduction they point out that this field of surgery is highly complex and that the confusion is increased by the widely different opinions and technics of different surgeons. They emphasize, therefore, the fact that they have no intention of trying to present "unalterable" technics. Their purpose is to offer the reader what has been learned thus far from experience at the Mayo Clinic with regard to the use of pedicle flaps for reconstructive operations, particularly about the head and neck.

The book opens with a brief discussion of pedicle flaps in general. Particular operations are taken up in detail later. There is an excellent chapter, abundantly illustrated, on simple and tubed pedicle flaps. Single and double flaps and their use are explained, as are the factors of elevation, delay and transplantation. The remainder of the book is given over to injuries or deformities of the head and neck and their treatment by the pedicle flap technic.

The work is not only adequately but admirably illustrated, and its brevity and pithiness make it decidedly valuable.

Diseases of the Stomach, Oesophagus and Duodenum. By Pierre Hillemand. Paris: Editions Medicales Flammarion, 1950. Pp. 894, with 323 double illustrations.

This is a complete, instructive, and up-to-date discussion of diseases of the organs mentioned in the title. These diseases are analyzed from the pathologic, etiologic, clinical and therapeutic viewpoints.

First, the congenital malformations are reviewed. This is followed by a study of inflammatory, neoplastic, nervous and vascular conditions of the esophagus, stomach and duodenum.

In the chapters devoted to the esophagus are included, among other subjects, the etiology, pathology, symptoms, evolution, complications, diagnosis, and treatment of carcinomas and sarcomas of this organ.

The section on the stomach presents specific cases illustrating the author's recommendations. After presenting the indications for and the medical treatment of gastric and duodenal ulcers, the advice is given that surgical treatment should be instituted for (1) all ulcers presenting a suggestion of malignancy; (2) all ulcers associated with abundant or repeated hemorrhage; (3) ulcers progressing toward stenosis, and (4) ulcers resisting medical treatment.

Chapters are devoted to the treatment of

gastric hemorrhage and gastric perforation as well as pyloric stenosis and stenosis of other types.

About one hundred pages are devoted to the study of inflammatory or toxic disorders of the stomach.

Benign tumors of the stomach and of the duodenum, adenomas, fibromas and lipomas, form instructive chapters also.

The physician will find in this work valuable information concerning gastritis, acute and chronic duodenitis, syphilis and tuberculosis of the stomach. The chapter on cancer of the stomach is detailed and its study will well repay the reader's interest.

A Study on Genital Tuberculosis in Women. By Henry Jedberg. Pp. 176. Lund, Sweden.

This monograph is a supplement to Volume 30, 1950, of **Acta Obstetricia et Gynecologica Scandinavica.** It contains an excellent and thorough review of the literature on genital tuberculosis in women and it also contains an analysis of 186 cases of surgically treated genital tuberculosis observed in a number of hospitals in different parts of Sweden from 1942 to 1945. This represents the second largest series in the literature. The following types of patients were investigated: 100 women in sanitoriums, suffering from active pulmonary tuberculosis, 102 women treated for renal tuberculosis, 155 women with abdominal tuberculosis, hysterograms from 1,783 examinations, cases of suspected or proved genital tuberculosis treated in the Malmo General Hospital and 24 cases of genital tuberculosis observed among 1,168 cases of sterility. This is an extensive study of a subject which is not fully appreciated by the average physician. Genital tuberculosis in women is far more common than is generally suspected. The disease usually remains silent for many years, and it is generally only a part of a tuberculous infection in the body. In Jedberg's series 56 per cent had a history of tuberculosis elsewhere, and in 36 per cent there were coexistent tuberculous lesions elsewhere in the body. It is important for all women who have been placed in sanitoriums for pulmonary tuberculosis to be examined for genital and renal tuberculosis, because in 8 per cent of the sanitorium cases in this series the patients had genital and renal tuberculosis.

A definite diagnosis of pelvic tuberculosis is difficult but can be made by examination of the uterine endometrium (obtained by biopsy), culture of menstrual blood and cervical mucos on Loewenstein's medium, and guinea pig inoculation and hysterosalpingography.

At present, treatment should be conservative (paraaminosalicylic acid and streptomycin). Surgical therapy should be reserved for women who do not respond to conservative treatment. Patients should receive preoperative and postoperative antibiotic therapy and also sanitorium care before and after operation.

This monograph is highly worth-while reading. It is well written and full of useful information.

Cancer As I See It. By Henry W. Abelmann. New York: Philosophical Library, Inc., 1951. Pp. 100.

Dr. Abelmann has here presented his observations of cancer, the result of extensive research, drawing conclusions which he applies to the disease as a whole. He begins his inquiry by discussing the difficulties that may arise through faulty definition of terms, so that conditions not generally recognized as cancer may be overlooked, although they are actually various aspects of this disease. At a later point in the discussion the terminology is simplified by a classification of the various types of cancer according to the structure and function of the body cells, since cancer is not a corrupting factor of itself but rather a form of deterioration within a given organ or tissue. In the author's opinion the bulk of the evidence is in support of his theory that cancer is due to a "definite parasite organism, namely, a mold fungus," a concept which allows for an ultimate common cause of the various effects produced by cancer as it causes changes in the structure and function of the cells. Factors reducing resistance to invasion of this parasite are believed by the author to be cellular irritants and heredity. Some comment is also made about the possibly infectious nature of cancer with respect to this parasite. Every feature of cancer is discussed in relation to a parasitic origin, exact knowledge of the cause being necessary, says the author, before successful preventive measures can be accomplished. A review of the work done by others on the basis of this same parasitic theory is presented.

Diabetes Mellitus. By Garfield G. Duncan. Philadelphia: W. B. Saunders Company, 1951. Pp. 289, with 32 illustrations.

The author, writing in collaboration with three professional colleagues (Drs. Ferdinand Fetter, Perry S. MacNeal and Barkley Beidleman) and the Director of the Food Clinic at Pennsylvania Hospital (Martha A. Hunscher) has undertaken to provide physicians and students with "a practical and simplified outline of therapy" for diabetes mellitus, at the same time offering a correlation of long-standing and recently acquired knowledge of this disease. The purpose is well accomplished in this convenient volume.

The nature, history, incidence, etiology and prognosis of diabetes are discussed, and a chapter is given over to the use of various forms of insulin in its treatment. In the sections dealing with the physiologic and pathologic changes associated with the condition, the discussion is particularly comprehensive and usable. Following these are thoroughgoing chapters on symptoms, physical signs, diagnostic points, food requirements, therapy and complications, the last-mentioned including pregnancy. An entire chapter is devoted to the diabetic child and the special requirements applicable to such a patient. In short, it would be hard to imagine a fuller treatment in so compact a volume. In addition to the illustrations, there are many tables of immediate reference value.

Primer on Fractures. Prepared by the Special Exhibit Committee on Fractures in Cooperation with the Committee on Scientific Exhibit of the American Medical Association. New York: Paul B. Hoeber, Inc., 1951. 6th ed. Pp. 109.

This small volume is packed full of facts concerning the treatment of the more common types of fracture. Naturally, in such a limited space one cannot expect to find detailed discussions, but the important features of the standard methods of therapy are described in clear, concise fashion.

In addition, there are brief discussions of emergency first aid, application of casts, and physical therapy. Also included are check lists of splints and accessories for the doctor's office and for his automobile.

A basic text of this kind is of great value to the practitioner who sees and treats only an occasional fracture. It may also be very useful to the advanced medical student in acquainting him with the essential elements of fracture therapy.

A Study in Slipped Upper Femoral Epiphysis. By Torsten Jerre. Copenhagen: Ejnar Munksgaard, 1950. Pp. 157.

This excellent monograph reflects an exhaustive amount of work by the author. His objective was twofold, to determine the late functional and roentgenologic results, and to discuss the value of closed reduction.

He has collected a total of 166 patients (200 hips) of whom 83 per cent were male. On the basis of roentgenograms taken during adolescence 38 of the patients showed bilateral involvement. However, the long term follow-up brought out the interesting fact that 30 additional patients showed roentgen changes on the "healthy" side. Aseptic necrosis appeared in 20 cases (in only 8 cases was open reduction employed). The incidence of aseptic necrosis was definitely higher in those cases in which closed reduction produced an improvement in position of the capital epiphysis.

The late reexamination of these cases (153 patients, 183 hips) provides some interesting and valuable information. The time between original treatment and reexamination varied from three to thirty years, the average being fifteen and one-half years. As one would expect, the extent of epiphyseal displacement has a pronounced influence on the late functional result. There was slow but progressive deterioration of function with advancing age. After aseptic capital necrosis and so-called necrosis of the joint cartilage the late results were very poor.

The author's conclusions are of value with regard to closed treatment (only 8 of 200 hips were treated by open reduction) and they are rather discouraging. Of the 24 hips in which closed reduction was successful, 10 progressed to aseptic necrosis (41.7 per cent. Of the many in which closed reduction produced no change in position of the epiphysis aseptic necrosis occurred in only 7.5 per cent, but, because of malformation of the femoral head, the late functional results were poor.

This extensive study illustrates clearly that in order to obtain a good functional result treatment must be instituted before more than minimal slipping has occurred.

Abstracts from Current Literature

Caudal Anaesthesia, Lumbar Peridural Anaesthesia and Bilateral Lumbar Sympathetic Block With Single Doses of Xylocaine in 231 Deliveries. Risholm, L., Acta Societatis Medicorum Upsaliensis 55:323, 1950.

This is a report of synthetically prepared xylocaine in 231 deliveries using caudal anesthesia, lumbar peridural anesthesia, and peridural lumbar sympathetic block by the single dose method.

Xylocaine was used because it has proved to be an effective local anesthetic, rapid in action, with good spreading tendency in the tissues and prolonged effect. As compared with procaine, xylocaine has a greater absolute toxcity, but its relative toxcity is less pronounced owing to stronger anesthetic effect and to its greater tendency to spread the tissues.

The advantages of conduction anesthesia and the physiologic character of labor pain are presented to aid in the understanding of the local technics.

A 2 per cent solution of xylocaine with adrenelin added varying between 1: 50,000 and 1: 20,000 was used in all cases.

The caudal anesthesia was used for 191 patients, with 20 ml. of xylocaine found as a suitable dose to give anesthesia to a T10 level. Of these, 138 patients were given one injection each, while 53 were given repeated injections in order to prolong the anesthesia. In 85 cases in which the duration of anesthesia was carefully noted, this varied between one hour and thirty minutes and five hours and thirty minutes. The arithmetical mean was three hours and twenty-eight minutes.

Lumbar peridural anesthesia and bilateral and lumbar sympathetic block were done in order to relieve pain only and attempt to avoid a delayed expulsion stage. Since there is a maximum anesthetic effect on a level with T11 and T12, the authors believe that the expulsion reflex is not inhibited. In the peridural method 4-10 ml. of xylocaine was injected between L1 and L2 and L3, with the patient sitting. The disadvantage of peridural and lumbar sympathetic blocks was that, as the fetal head descended, lower vaginal and peridural pain was present, necessitating general anesthesia for relief.

Xylocaine has proved suitable as an anesthetic in obstretrics and seems to prolong the period of anesthesia.

V. N. BALOVICH, M.D.

Effect of Posterative Bed Rest and Early Ambulation on the Rate of Venous Blood Flow. Wright, P. H., Osborn, S. B., and Edmonds, D. G., Lancet, Jan. 6, 1951, p. 22.

The problem of venous stasis in the limbs of patients during the postoperative period were studied. The methods generally used for measuring the rate of blood flow are not completely satisfactory, since the results are subject to personal errors and the patient's reaction, and also because the sites at which recognizable reactions can take place are few. With the use of radio-isotopes, however, the results are more precise, since the instant of first arrival of a radio-isotope introduced into a vein can be detected with objective precision at any proximal point in the vessel.

Radio-active Na24 was injected intravenously into the extremity (foot or hand). The time of the first arrival of the isotope at the proximal end of the limb was detected by a Geiger-Müller counter placed over the femoral triangle for the leg and the axilla for the arm. One hundred and seventeen patients were studied postoperatively and at weekly intervals during convalescence. They were grouped into those who were walking at the time of recording and into those who had remained uninterruptedly in bed since the operation. Also, since it had been shown that there was a retardation of venous flow in the legs, first apparent during the second trimester of pregnancy, it was thought comparable to the latter to study the effect of venous flow in the legs of patients with pelvic tumors which gave rise to masses larger than a sixteen-week pregnancy, and thus a third grouping was arrived at.

The mean rate of venous flow in the arms and legs of patients continuously confined to bed showed a progressive slowing until the fifteenth day. Thus there was a generalized venous slowing in the limbs, and presumably in the circulation as a whole. The mean rate of venous flow in the ambulatory group showed no such slowing. As a matter of fact, there was an increase in the rate-flow of which was more marked in the legs

and reached a maximum ten to twelve days after the operation. It thus seems that the immobilized patient has a progressive slowing of the venous flow in both legs and arms during the postoperative phase, and that in ambulant patients, venous flow rates show an acceleration just at that time when such patients are most vulnerable to the other factors which contribute to thrombus formation. In the patients from whom pelvic masses were removed, it was felt that the reduction of the intraabdominal pressure had a greater influence on the rate of venous flow than did the postoperative ambulation.

RAYMOND GREEN, M.D.

Intra-Arterial Histamine in Treatment of Claudication and Rest Pain. Mackey, W. A., Brit. Med. J. 2:1806, 1950.

Fourteen cases of arteriosclerosis obliterans have been treated by Mackey with weekly injections of 2 mg. of histamine phosphate into the femoral artery at the groin. The histamine is dissolved in 500 ml. of physiologic solution of sodium chloride and administration customarily takes thirty to forty-five minutes. Injections are continued at weekly intervals for a period of ten weeks.

Theoretically this method would not be selective, in that it affects all the blood vessels, both deep and superficial; the advantage, the author claims, being that the sympatholytic drugs are essentially cutaneous dilators. While lumbar sympathectomy frequently relieves rest pain, it does not often enough improve claudication. This is because the arterioles of the skin are much more completely under the control of the sympathetic nervous system while those of the muscles respond mainly to the metabolites of muscular reaction.

Nine patients showed satisfactory improvement with this form of treatment. They averaged approximately five years younger than the 5 who showed no improvement or unsatisfactory results. Most of the results are classified as "improved" chiefly on the subjective sensations of the patients, since there is little or no improvement in oscillometric and other commonly used objective methods of measuring circulation in the periphery of the vascular system. None of the patients was apparently made worse by this form of treatment, although in some of them the disease continued to progress either in the same limb or elsewhere in the circulation.

MORRIS T. FRIEDELL, M.D.

Potassium Loss in Experimental Intestinal Obstruction. Schilling, J. A., McCoord, A. B., and Clausen, S. W., Surg., Gynec. and Obst. 92:1, 1951.

The authors have reviewed the literature and have described their methods in the production of intestinal obstruction at various levels in healthy mongrel dogs. Sodium, potassium, chlorides, and water balance studies were made at intervals before death and at autopsy, and were compared with material obtained from jejunal fistulas made in normal animals. Tissues obtained at autopsy were similarly examined. Their conclusions are as follows:

1. The acute loss of potassium was relatively small and did not exceed 4 per cent of the body total compared with the acute loss of sodium, which approximated 25 per cent in certain instances.

2. There is an important and prompt interchange within the cell between sodium and potassium after administration of one of these cations.

3. Displaced potassium is promptly excreted in the urine despite total body depletion.

4. With a negative nitrogen balance there was no retention of potassium after its administration. Retention of sodium always occurred with a delayed diuresis.

5. The concentration of sodium and potassium in normal intestinal secretions remained remarkably constant during excess administration and depletion.

6. Serum concentrations of sodium and potassium also remained quite constant, except terminally in some moribund animals when there was a lowering of sodium and a sharp rise of potassium levels.

7. The sodium concentration is approximately equal to, and the potassium concentration several times greater than, their respective serum levels in abnormal fluids lost during intestinal obstruction.

8. The varying levels of potassium concentration in abnormal fluids seemed to reflect the degree of strangulation and necrosis of the obstructed loops.

9. Within the cell there was a tendency for greater depletion of sodium than of potassium.

10. Potassium loss per se was not toxic under the experimental conditions mentioned but was intimately related to the relatively greater sodium and water loss and the corresponding intracellular and extracellular readjustments. HOWARD S. STERN, M.D.

The Manubriosternal Joint in Rheumatoid Arthritis. Bogdan, A., and Clark, J., Brit. M. J., Dec. 16, 1950, p. 1361.

That the manubriosternal joint can be involved in rheumatoid arthritis is illustrated by 5 clinical cases. Rheumatoid arthritis commonly affects synovial joints, especially those at the periphery and where there is considerable mobility, whereas the manubriosternal joint is usually cartiliginous and has very limited movement.

In the 5 cases reported, the early stages presented pain, swelling and tenderness at the joint, and these may be the first manifestations of rheumatoid arthritis. The pain is aggravated by respiratory movements, coughing, sneezing, yawning and exertion. Soft tissue swelling may be present. Roentgenologic changes, when present, are best seen in lateral views, and show soft tissue swelling, irregularity and narrowing of the joint space, erosions of the articular surfaces, and irregular expansion of the articulating ends of the manubrium and sternum.

RAYMOND GREEN, M.D.

Acute Gaseous Cholecystitis. Gowdey, J. F., and Copeland, M. N. New Eng. J. Med. 242:647, 1950.

Acute gaseous cholecystitis is an uncommon preoperative finding and the authors were unable to find reports of more than 15 such cases, exclusive of the 1 case which they report from the Pittsfield General Hospital, Pittsfield, Massachusetts. The distended gallbladder, full of air and showing a fluid level, was noted during routine flat film and spot film examinations of the abdomen of a patient with rather typical acute suppurative cholecystitis. There are four illustrations of these appearances, showing the gas-filled gallbladder with a fluid level and absence of gas in the rest of the biliary tree. The cultures of gallbladder wall and contents gave positive results for gram-positive gas-forming bacilli, not specifically identified, and small numbers of a gram-negative bacillus. Recovery of the patient followed partial cholecystectomy and drainage performed on the fifth day of the disease. The condition is differentiated from similar air-shadows in the gallbladder seen after the occurrence of cholecysto-duodenal fistula or regurgitation of air through an incompetent sphincter of Oddi. Early operation is advised as the treatment of choice.

Indirect Air Cystoscopy. Ridley, J. H., South. M. J., February 1951, p. 114.

A method of cystoscopy is presented which utilizes the indirect lens instrument with air instead of water as a medium. The method is limited to examination of the female because of the knee-chest position required.

The author comments upon several apparent advantages of utilizing this technic. Less general equipment is required and contamination is thereby reduced. The technic produces less discomfort, which compensates for the position required.

It is stated that an undistorted view of the vesical mucosa is obtained which allows a more accurate appraisal of vesicovaginal fistulas and facilitates the diagnosis of Hunner's ulcer.

Topical applications and biopsies are readily performed. Preoperative ureteral catheterization is facilitated by this technic.

It is emphasized that this method is presented as an adjunct to other methods of cystoscopy and would find useful application in female urologic conditions.

JACK HYMAN, M.D.

Bladder Stones. Maurer, J. E., Lich, R., and Burdon, S. B., Am. J. Surg. 81:295, 1951.

The unpredictable morbidity and mortality of vesicolithotomy through a high cystotomy prompted the authors to utilize an extravesical retropubic approach.

The delayed closure of the high cystotomy wound was thought to be related to lack of immobility and poor vascularity. The vascular supply of the bladder and prostate was reviewed, and the vascularity of the vesical neck and prostatic capsule was apparent.

A retropubic approach using the technic of Millin was employed in 10 cases of vasical calculi. Prostatic adenomas, if present, were enucleated. The vesical neck could then be forcibly dilated and calculi easily removed. The usual closure with urethral catheter drainage was employed.

Morbidity was minimized; and there was no mortality. The hospital stay was shortened considerably.

The procedure is recommended for calculi of less than 2 inches (5 cm.) in diameter when no other vesical pathologic surgical condition exists.

JACK HYMAN, M.D.

Peroral Estrogen: Parke, Davis and Co. offers Menagen, an estrogen for oral administration. Each soft gelatin capsule contains natural estrogenic factors equivalent to 10,000 international units of ketohydroxyestratriene.

The compound produces all the physiologic effects of natural estrogenic hormone. Menagen is tasteless and odorless. Readily absorbed from the gastrointestinal tract, Menagen induces rapid response, is free of side actions, and supplies the plus value of psychic "lift" less obvious with synthetic estrogen. Physiologic action of each Menagen Capsule is at least equivalent to that of 0.5 mg. diethylstilbestrol. Menagen is said to be effective and economical in management of menopausal symptoms and other conditions amenable to estrogen therapy. One or two capsules daily after meals usually suffices in menopausal cases. The dose may be increased at the discretion of the physician. Menagen is available in bottles of 100 and 1000 flame-colored capsules.

Telephone Aid: An automatic telephone-answering machine, the electronic secretary, is now available for professional use. No longer need the doctor miss any telephone calls because he is busy or away on a call. The Electronic Secretary answers automatically, takes a message and also tells the caller when the doctor will return or where he can be reached. It is manufactured for and distributed by Electronic Secretary Distributors, Inc., of Milwaukee, Wisconsin.

The Electronic Secretary is easily installed, as it is not connected to the telephone. The unit also serves as a handy dictation machine.

One physician in Wisconsin reported receiving three to five appointments every week end after the office was closed. Another had all his calls transferred to his home at night when the office was closed. He remarked it brought about a happier patient response.

Dia-Discs: The availability of Dia-Discs has just been announced by CSC Pharmaceuticals, a division of Commercial Solvents Corporation. Dia-Discs are small diagnostic tablets containing measured amounts of antibiotics and are used for the purpose of determining the antibiotic to which an infectious organism is most sensitive.

According to the distributors, Dia-Discs quickly tell the physician the most effective antibiotic to use and also give a good indication of the antibiotic sensitivity of the organism. Thus they place antibiotic therapy on an accurate basis, a distinct advantage when organisms of obscure identity and sensitivity are encountered.

Six different Dia-Discs are available, representing the six antibiotics in common use today: Penicillin, Bacitracin, Streptomycin, Chloromycetin ® (chloramphenicol, Parke, Davis and Co.), Aureomycin, and Terramycin. Two potencies of each antibiotic are supplied, thus assuring accuracy over the entire range of sensitivity.

Dia-Discs are supplied in boxes of 24, each tablet individually sealed in pliofilm, and are available as a unit in a convenient box, together with a "sensitivity chart" which enables the technician to interpret quickly the results of observation.

The technic for using Dia-Discs is simple. Up to six tablets may be placed on a previously streaked Petri plate, which is then incubated overnight. The diameter of the inhibition zone surrounding each tablet gives accurate indication of qualitative and quantitative sensitivity. For complete information, write to J. Burnside Co., 1148 E. Grand Street, Elizabeth, N. J.

Dipping Refractometer: The improved dipping refractometer by Bausch & Lomb Optical Company of Rochester, New York, is an immersion-type instrument that permits testing of transparent liquids with refractive indices between 1.32 and 1.54. An index accuracy of 3.5 units in the fifth decimal place may be obtained. The instrument may be used for applications ranging from research analysis to industrial product control in distilling, brewing, milk processing, and general chemical testing. It has potentialities also in the field of education.

The new liquid-tight metal beaker is said to prevent seepage and rapid evaporation. An extra long splash collar gives added protection against penetration of liquids into compensator and instrument. The enclosed scale, fully protected by tube enclosure, is graduated in 100 divisions, with every tenth division numbered. A micrometer drum permits precise reading to tenths of scale units. Six interchangeable prisms cover the index range from 1.32 to 1.54, with individual ranges overlapping for continuous reading.

In Memoriam

WILLIAM L. WALLACE

M.D., F.I.C.S.

The State Department has reported that Dr. William L. Wallace, a Southern Baptist medical missionary, died February 10 in prison at Wuchow, Kwangsi province, the victim of Chinese Communist persecution. He was 42 years old.

Dr. Wallace was born in Knoxville, Tennessee, and received both his preliminary education and his medical degree from the University of Tennessee. He pursued postgraduate studies at the University of Pennsylvania Graduate School of Medicine and the Cook County Graduate School of Medicine. He served his hospital internship at the Knoxville General Hospital, Knoxville, Tennessee and for one year before going to China, Dr. Wallace was house surgeon there. From 1935 to the time of his death he served as surgeon and head of the surgical department at the Stout Memorial Hospital at Wuchow, Kwangsi, China, greatly respected and beloved for his unselfish work as a medical missionary.

Dr. Wallace was a member of the American Medical Association, the Chinese Medical Association, the Tennessee State Medical Association and the International College of Surgeons. The entire College deeply mourns the tragic, unnecessary and untimely loss of such a colleague.

ROY DONALDSON McCLURE

M.D., F.I.C.S. (HON.)

Dr. Roy McClure, prominent Detroit surgeon, died of a heart attack on March 31 at the age of 69. Since 1916 Dr. McClure had been chief surgeon of the Henry Ford Hospital, which he organized at the request of the late Henry Ford. Born in Bellbrook, Ohio, Dr. McClure was graduated in 1904 from Ohio State University, studied further at Johns Hopkins Medical School and completed his education at the University of Prague. Dr. McClure did educational work and served the Government in two World Wars. After World War II he developed, for use during operations, a warning device which records changes in the oxygen content of the blood. Dr. McClure was active in early experiments pertaining to blood vessel suture and transplantation of organs, and was one of the first to perform a blood transfusion by direct blood vessel suture between donor and patient. He helped perfect a standard treatment of burns. Under his direction many advances were made in thyroid and breast surgery. During his lifetime Dr. McClure performed almost 30,000 major operations, most of them at the Ford Hospital.

The officers and members of the International College of Surgeons extend their warmest sympathy to the bereaved family and friends.

WILLIAM GUY DORAN

M.D., F.A.C.S., F.I.C.S.

In November 1950 William Guy Doran of Jersey City, New Jersey, died at the age of 64. A graduate of the Cornell University Medical College, Dr. Doran completed his further studies at the Istituto Ortopedico Rizzoli in Bologna, Italy, and the R.A.M.C. Orthopaedic Hospital, Hollymore, Birmingham, England. His internship was served at St. Vincent's Hospital in New York City. As visiting orthopedist Dr. Doran was affiliated with the following hospitals: St. Vincent's Hospital in New York, the Medical Center in Jersey City, New Jersey, St. Mary's Hospital in Hoboken, New Jersey, and the United States Marine Hospital in Staten Island, New York. Dr. Doran's practice was devoted entirely to orthopedic surgery.

In addition to holding a fellowship in the International College of Surgeons, Dr. Doran was a member of the American Medical Association, the American College of Surgeons, the American Academy of Orthopaedic Surgery, the Society of Surgeons of New Jersey and the county and state medical societies of New York and New Jersey.